QAD Enterprise Applications
Enterprise Edition

Training Guide
QAD Product Costing

Contents

QAD

QAD Product Costing
Change Summary

The following table summarizes significant differences between this document and the last published version.

Date/Version	Description	Reference
April 2016/v2016 EE	Rebranded for QAD 2016 EE, added links to Preface and book	--
April 2015/v2015 EE	Rebranded for QAD 2015 EE	--
March 2014/v2014 EE	Rebranded for QAD 2014 EE	--
September 2013/v2013.1 EE	Rebranded for QAD 2013.1 EE	--
March 2013/v2013 EE	Rebranded for QAD 2013 EE	--
September 2012/v2012.1 EE	Rebranded for QAD 2021.1 EE; Consistency edit	--
March 2012/v2012 EE	Rebranded for QAD 2012 EE	--
September 2011/v2011.1 EE	Rebranded for QAD 2011.1 EE	--

About this Course

Course Description

This QAD Product Costing training guide provided instructions on how to develop product costs, including the factors that affect costing, how costs are calculated, and where they can be viewed. In addition, it provides detailed instruction on manufacturing variances, how they are calculated, and how they are generated.

This guide can be taught individually or as a part of the Product Costing and Cost Management course set, which consists of an introductory class, a class covering general setup topics, and a set of classes on specialized costing topics. Most students will benefit from taking the first two classes and then selecting the additional courses that apply to their business implementation. The complete list of classes is:

- Introduction to Product Costing
- Product Costing
- Advanced Repetitive Costing
- Average Costing
- Co/By-Product Costing
- Cost Management, including Simulation and Planning
- Purchase Costing
- Work Order Costing

Course Objectives

Provides the structural framework and knowledge necessary to enter data and roll up product costs, and to understand the causes of variances.

Course Benefits

Provides the opportunity for personnel responsible for developing costs and explaining variances to understand how the system works.

Audience

Finance and operations personnel who develop product costs and explain variances.

Prerequisites

- *Training Guide: Introduction to Costing*
- Familiarity with the .NET UI

Course Credit and Scheduling

This course is valid for 6 credit hours and is typically taught in one day.

Virtual Environment Information

The hands-on exercises in this book should be used with the latest Enterprise Edition learning environment in the 10USA > 10USACO workspace. When prompted to log in, specify *demo* for user ID and *qad* for password.

Advanced Repetitive costing functionality is reviewed in the hands-on exercises in this book. The first exercise involves basic Advanced Repetitive transactions; subsequent exercises include variances, subcontracting, and scrap. Because this is a course on costing and not a course on Advanced Repetitive, the exercises in this book will be taking some shortcuts to minimize setup.

Additional Resources

If you encounter questions on QAD software that are not addressed in this book, several resources are available. The QAD corporate Web site provides product and company overviews. From the main site, you can access the QAD Learning or Support site and the QAD Document Library. Access to some portions of these sites depends on having a registered account.

http://www.qad.com/

QAD Learning Center

To view available training courses, locations, and materials, use the QAD Learning Center. Choose Education under the Services tab to access this resource. In the Learning Center, you can reserve a learning environment if you want to perform self-study and follow a training guide on your own.

QAD Document Library

To access release notes, user guides, training guides, and installation and conversion guides by product and release, visit the QAD Document Library. Choose Document Library under the Support tab. In the QAD Document Library, you can view HTML pages online, print specific pages, or download a PDF of an entire book.

For more information, see *QAD Costing User Guide*.

To find a resource, you can use the navigation tree on the left or use a powerful cross-document search, which finds all documents with your search terms and lets you refine the search by book type, product suite or module, and date published.

QAD Support

Support also offers an array of tools depending on your company's maintenance agreement with QAD. These include the Knowledgebase and QAD Forums, where you can post questions and search for topics of interest. To access these, choose Visit Online Support Center under the Support tab.

QAD

Product Costing Setup

Course Overview
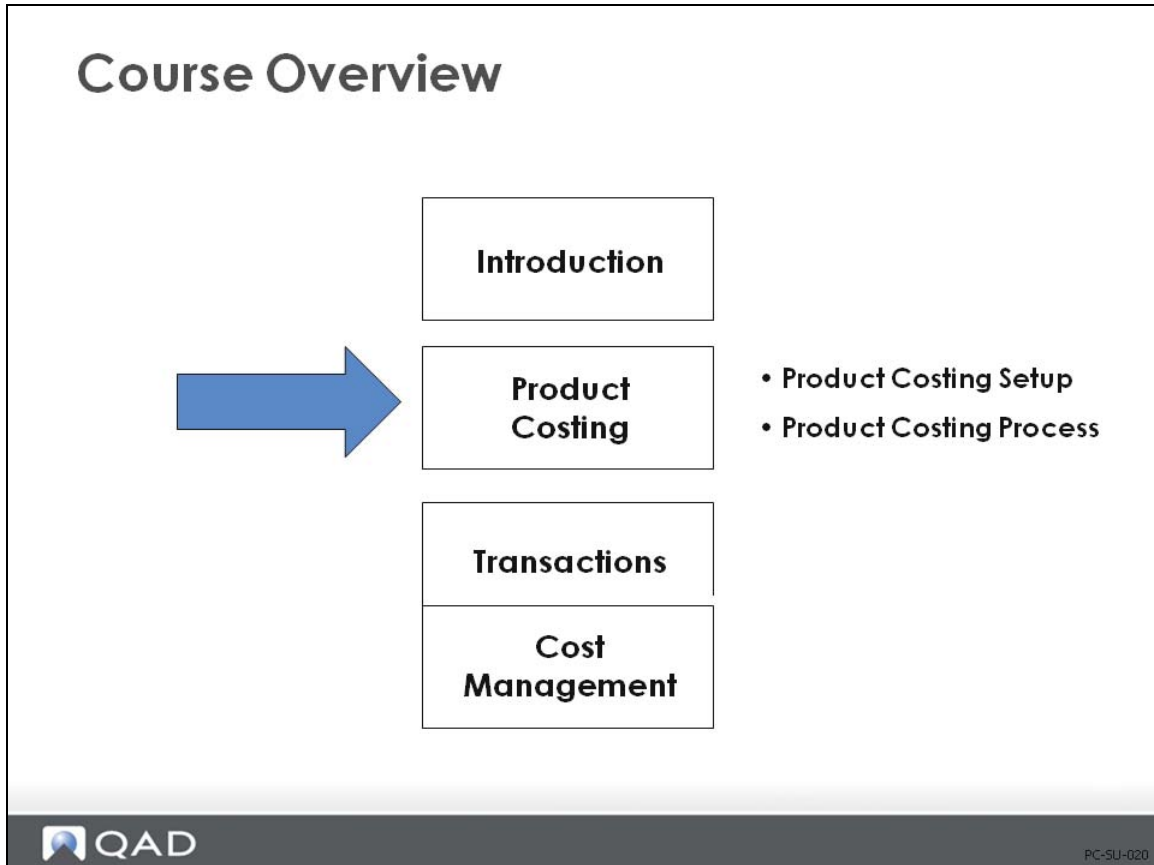
Topics
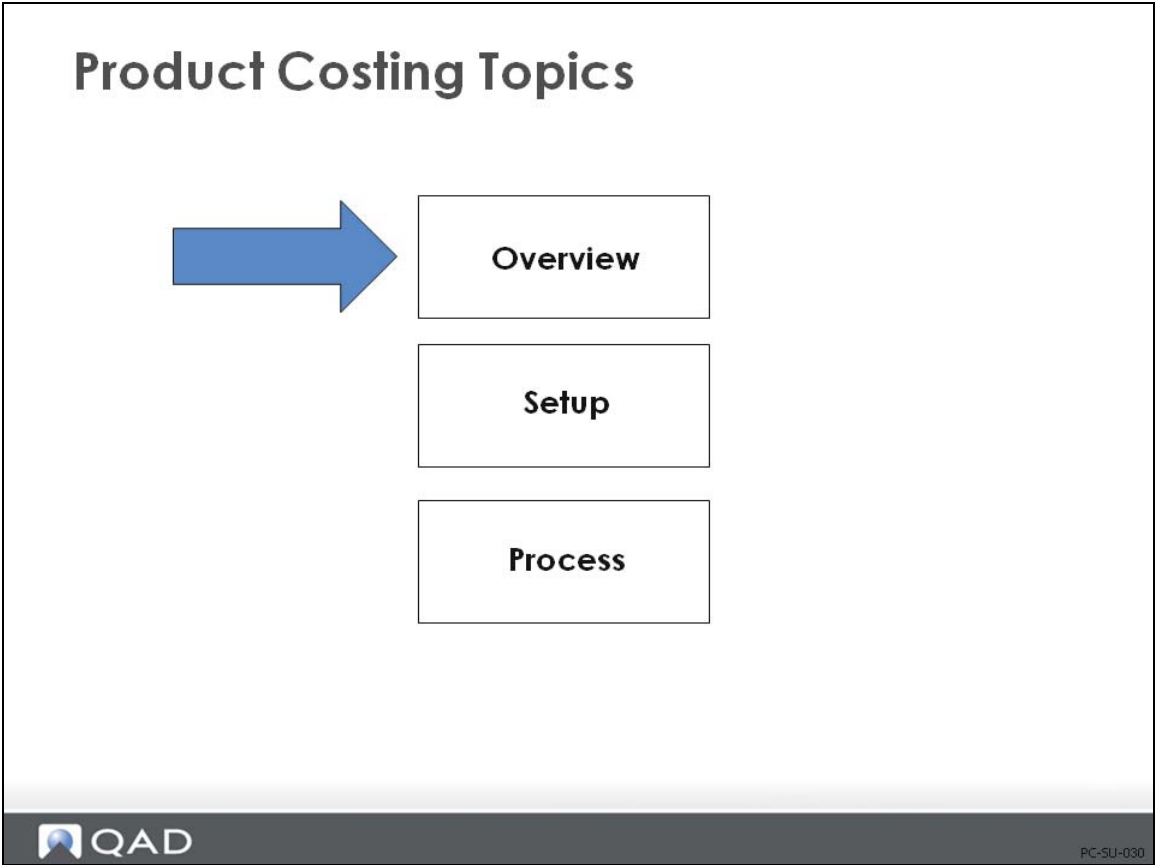
On the next page is a figure that depicts the full product costing process, including setup. This is followed by a summary of the steps for setup, which is the main focus of this section.

Product Costing Overview
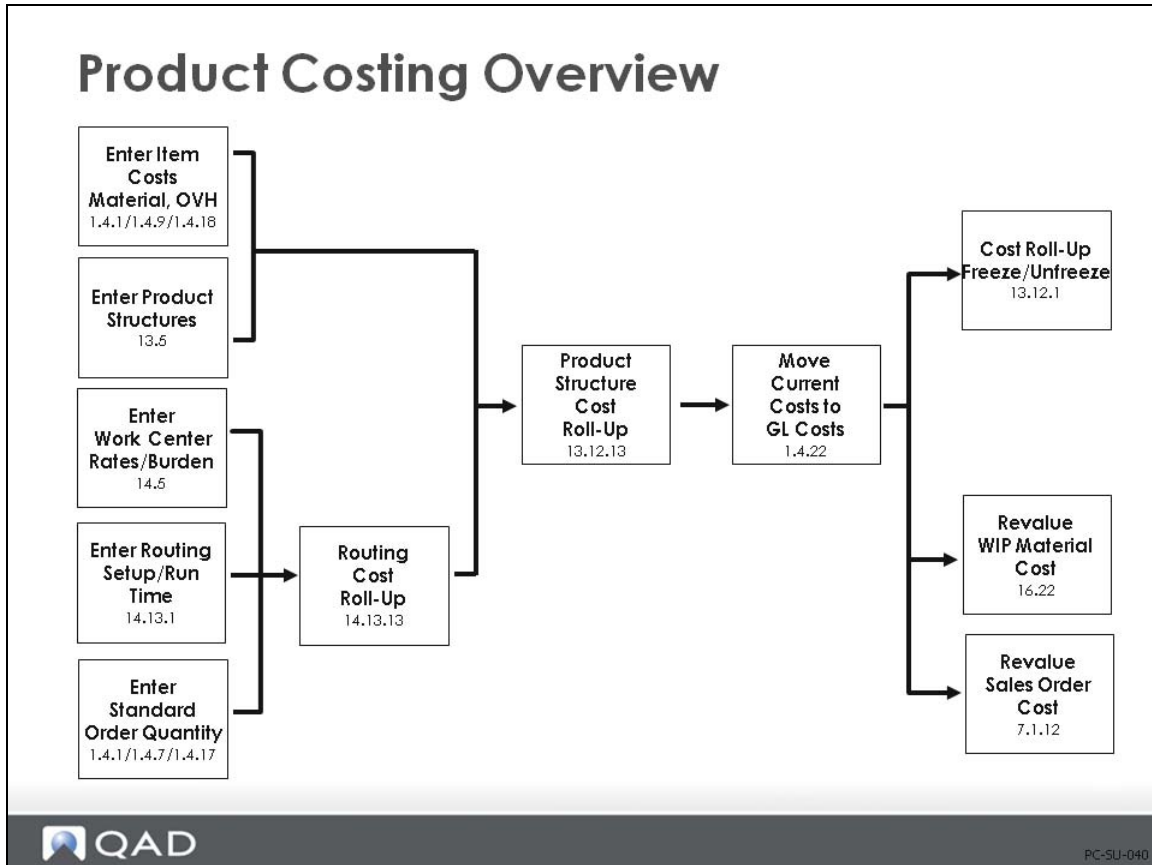
This chapter and the next will focus on the product costing process. The setup will be covered here and the costing process will be covered in the next chapter.

Product Costing: Summary of Setup
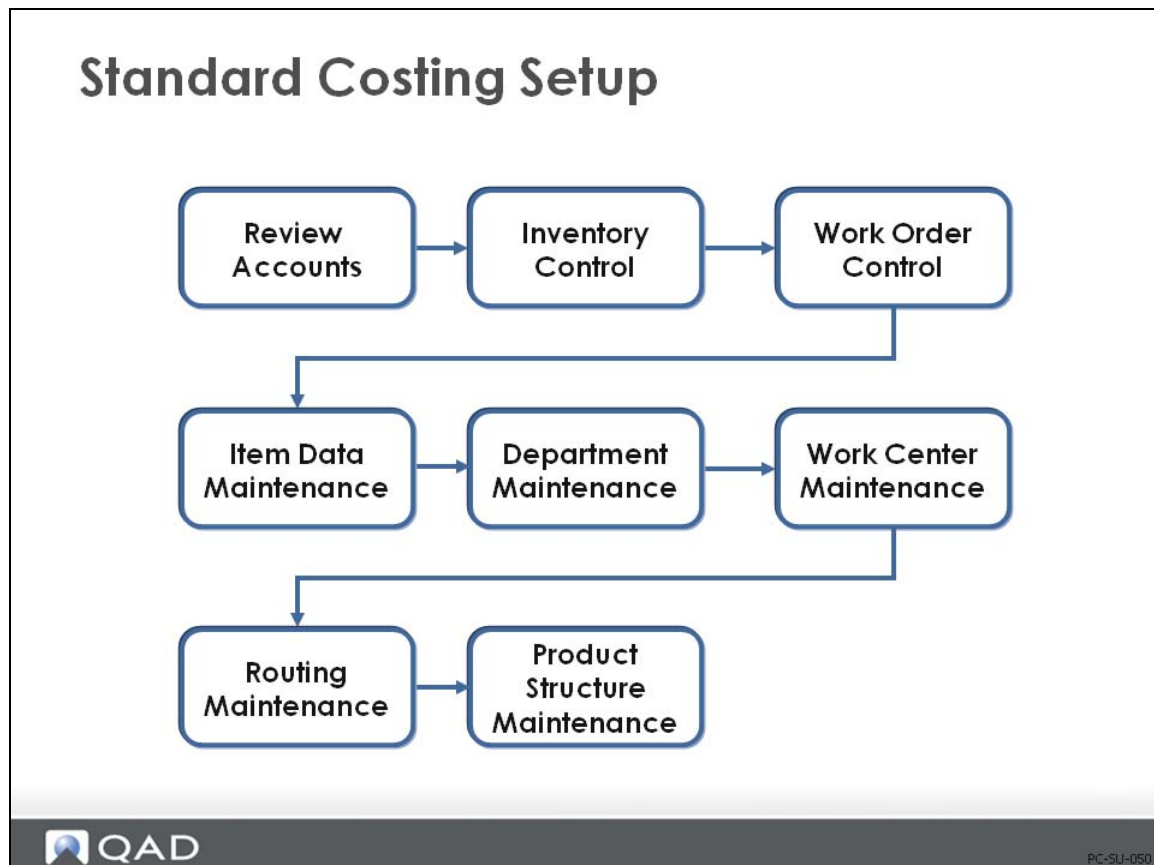
The steps that are covered in this chapter are summarized below.

1 Review accounts

These accounts are discussed in detail in the Introduction to Costing training guide.

2 Set up work order and inventory control programs

Several fields pertain to cost accounting in these control programs, including how current costs are maintained (as average, last, or none) and the accounts for intersite transfers; both are set in Inventory Accounting Control (36.9.2).

Another important setting is in Work Order Accounting Control (36.9.11), which lets you determine when labor and burden rate and usage variances get posted if you are reporting labor in the Shop Floor Control module.

3 Enter/review data in Item Master Maintenance (1.4.1)

Manually enter this-level costs (purchased materials and associated overhead) in the current cost set using Item Data Maintenance, Item Master Maintenance (1.4.1), Item Cost Maintenance (1.4.9), or Item Site Cost Maintenance (1.4.18).

Fields particularly relevant to item costing in the item planning frame are order quantity (identifies the standard order size for setup cost allocation), purchase/manufacture field, phantom field, and yield percent.

4 Set up departments in Department Maintenance (14.1)

The system creates general ledger transactions using the accounts associated with the department code to collect labor, burden, and subcontract costs. (The individual department accounts are discussed in detail in the Introduction to Costing training guide.)

5 Set up work centers in Work Center Maintenance (14.5)

The work center provides hourly labor rates, labor burden rates, labor burden percent, and machine burden rates, which are used in routing cost roll-ups.

6 Set up routings in Routing Maintenance (14.13.1)

Routings provide setup and run times per operation, machines per operation, and operation yield percent. Subcontract cost per unit is entered for each subcontracted operation.

7 Set up product structure in Product Structure Maintenance (13.5)

The product structure attaches components to the parent item and defines the quantity per. Scrap rates are entered. Product structure type codes are entered.

Setup
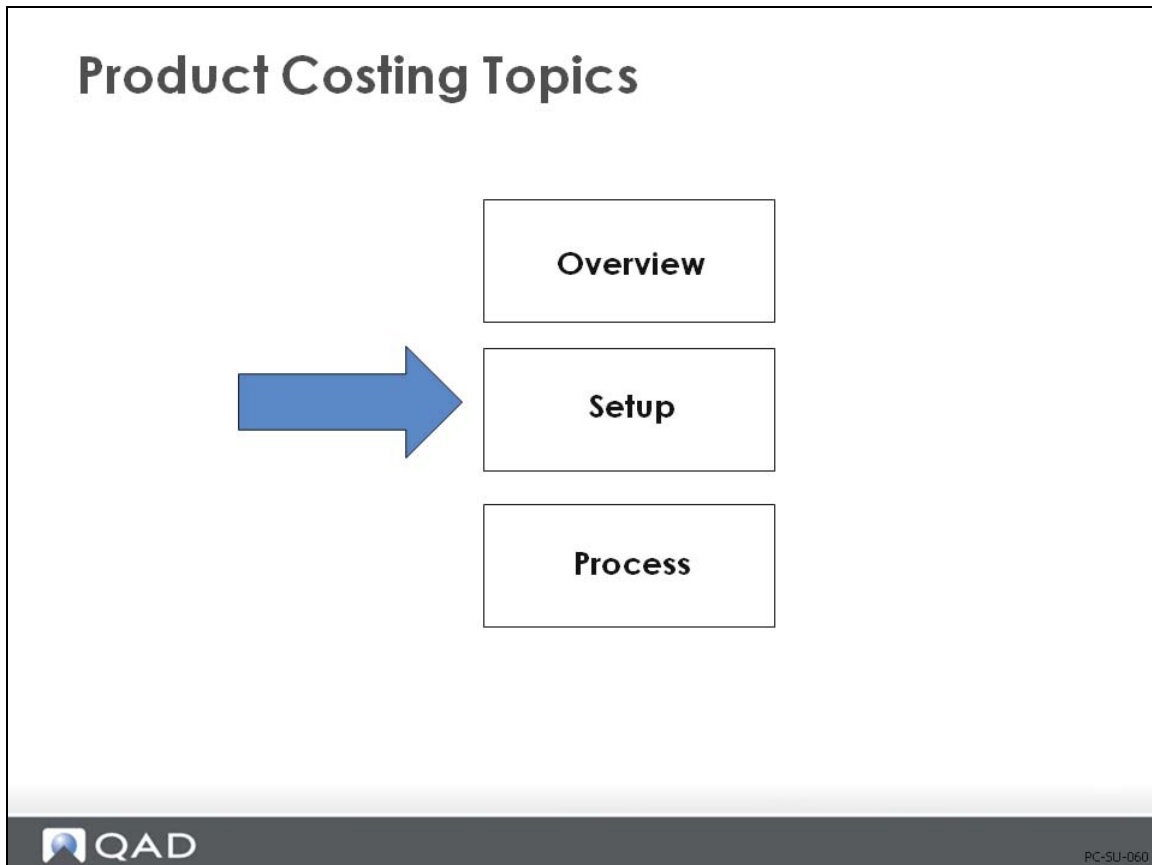
In this section, we will discuss the setup for product costing.

Review Accounts
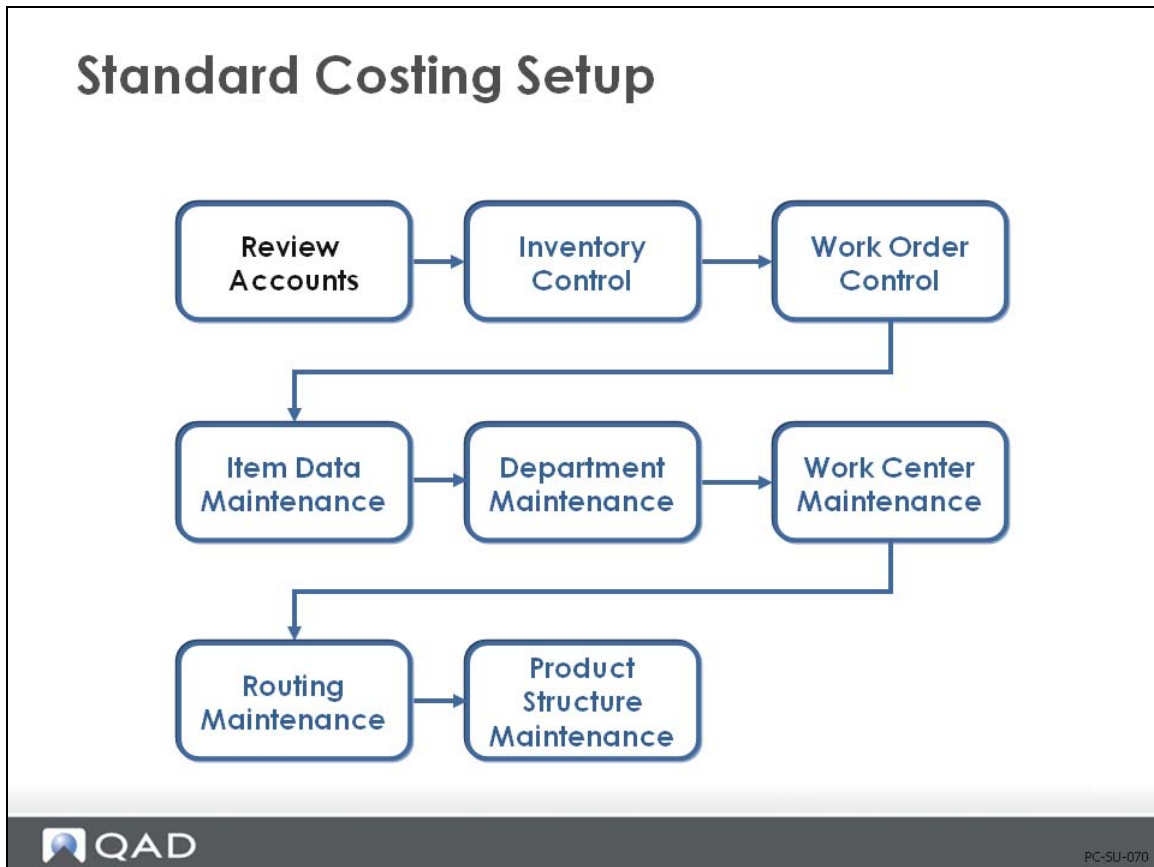
Accounts are discussed in detail in *Training Guide: Introduction to Product Cost Costing*.

Set Up Inventory Control
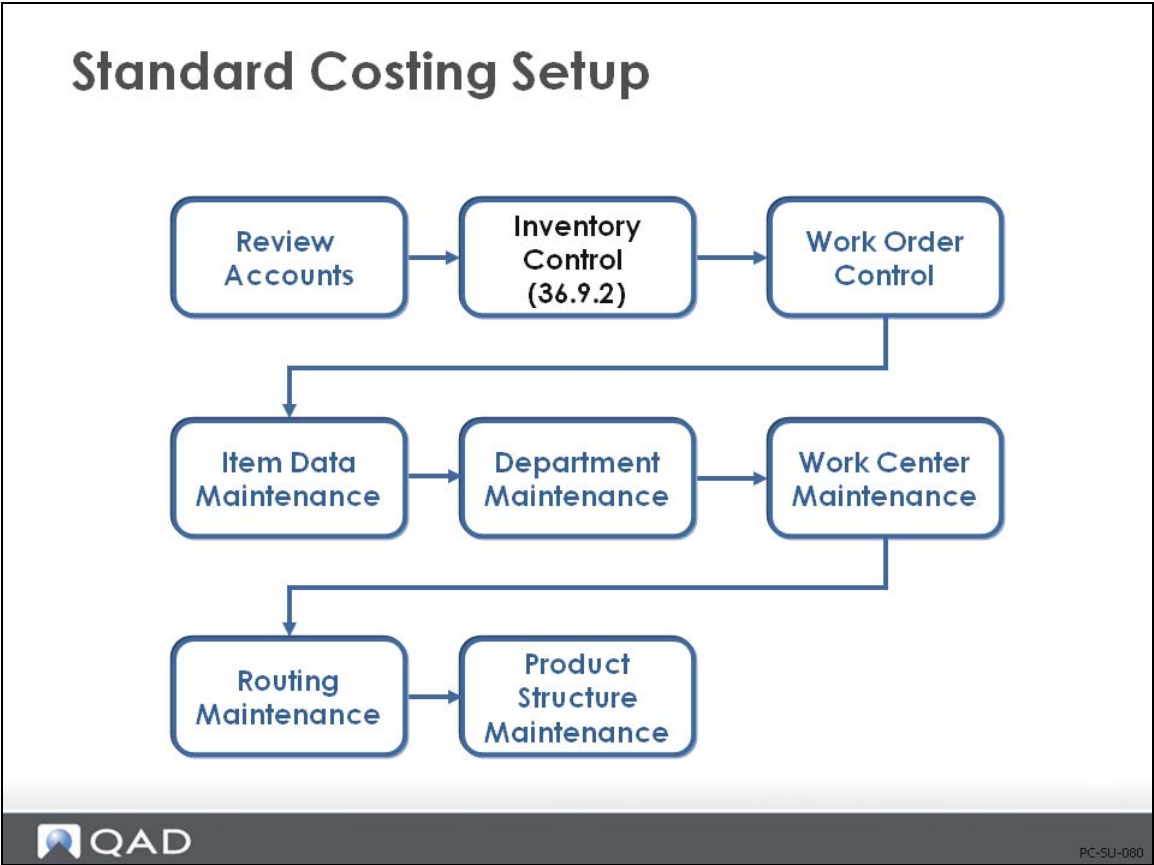
Several settings in Inventory Accounting Control (36.9.2) control how costs are calculated and how they are posted to the general ledger.

Inventory Accounting Control

Current Cost. Current material, labor, and burden costs are maintained as Average, Last, or None.

None: Current costs are not maintained by the system. This must be done manually. Even if purchase line items have the field Update Avg/Last Cost set to Yes, an Inventory Control setting of None takes precedence, so no update will occur.

Average: Current costs are updated using a simple weighted average. This occurs for purchased items when the purchase order is received. For manufactured items, labor and burden are updated by the work order accounting close to reflect the actual hours spent.

Last: The current cost is simply set to the last cost on the purchase order or work order.

This is a domain-wide setting; all current costs for any site in the domain will be maintained using the setting selected None, Average, or Last unless you use the Cost Management module.

Note   With the Cost Management module, you can use different cost sets with different costing methods at each site. Then use cost set to site assignment to specify which sites use which cost sets.

Sum Lower Level Costs into Material Cost. Cost of Goods Sold (COGS) is posted to the GL as the total (this-level plus lower-level) cost for each of the five cost categories: material, labor, burden, overhead, and subcontract. To report all lower-level costs as COGS-Material (as if all components were bought from outside suppliers), set Sum LL into Mtl Cost to Yes.

• Usually this field is set to No. Cost of goods sold amounts are maintained separately for each cost component. However, in some companies, the material cost for an end item is considered to include all costs associated with purchasing or manufacturing components, as well as any direct material costs. Then this field is set to Yes.

Current Cost from AP. If the Current Cost from AP field is set to Yes, then the current material cost is updated at vouchering. If the invoice price differs from the purchase order price, the current material cost is adjusted.

Transfer Clearing Account. Enter the general ledger (GL) account code used to track transfers within a site or between sites in the same entity. This field cannot be blank when multiple sites are defined. This must be a valid, active account of type Standard.

Transfers between sites in different entities are tracked using the Cross-Company Inventory Control account defined for the domain and the intercompany codes of the appropriate entities. In a single-site environment, the Purchase account is used when this field is blank.

Create GL Transactions. Indicates if general ledger transactions are to be created by inventory activities.

Yes: All inventory issues, receipts, count adjustments, and transfers will create a general ledger transaction reflecting the change in inventory asset balances. In addition, any transactions that affect work-in-process inventory will create general ledger transactions. This includes work order issues and receipts.

No: General ledger transactions will not be created by any of these activities.

This field does not impact Memo item transactions. These do not create inventory GL transactions regardless of this field.

Companies that do perpetual inventory accounting should set this field to Yes, taking advantage of the automatic journal transactions created by the system.

Companies using periodic inventory accounting normally set this field to No. With period accounting, the accountant manually calculates ending inventory based on beginning inventory plus purchases less cost of goods sold. Manual journal entries must be made to post the purchases and cost of goods sold amounts, since these will not be posted automatically by the system.

Mirror Accounting. Indicates whether mirror accounting is to be used.

Yes: Mirror accounts are used. Whenever an inventory transaction is processed, the system checks the Mirror Account Table to see if there are mirror accounts set up. If there are, the mirror GL transaction is created automatically.

No: Mirror accounts are not used. Any entries in the Mirror Account Table are ignored.

Mirror accounting is used in some European countries where changes in inventory are required to be immediately reflected in the income statement. With mirror tables, you can combine the creation of balance sheet inventory entries with the creation of related entries to income statement accounts by associating a pair of source accounts with a pair of mirror accounts.

Mirror accounting only applies to inventory (IC) transactions. Whenever an inventory transaction creates a general ledger (GL) entry for a specified combination of source accounts, the system automatically creates GL entries to the related mirror accounts.

Set Up Work Order Control
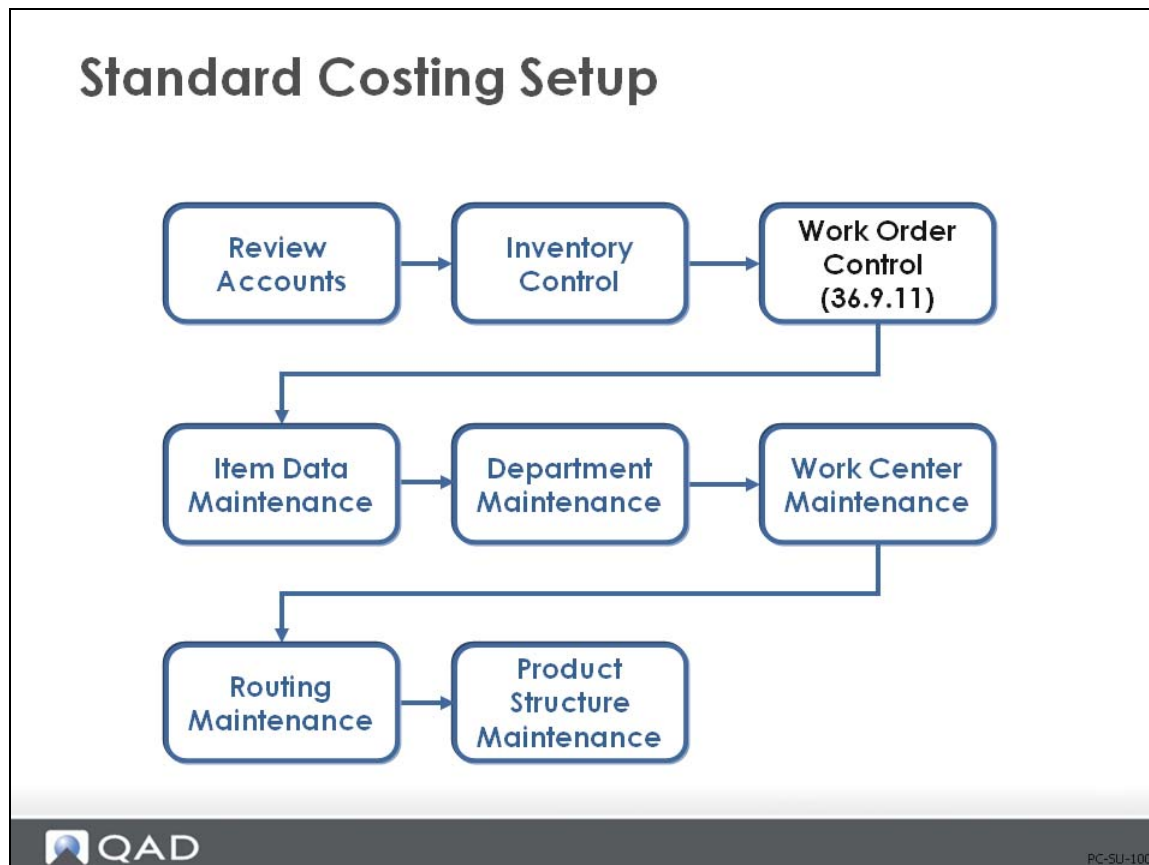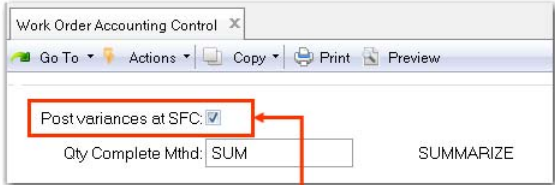
Review the Post Variances at SFC (Shop Floor Control) field. This determines when labor and burden variances are calculated and posted if you are reporting labor.

If you do not report labor, then labor and burden amounts are absorbed at GL cost and no variances will be calculated if you indicate Previous Ops Complete (Work Orders) or set the Auto Labor Report field to Yes in Routing Maintenance (Advanced Repetitive)

Work Order Accounting Control

Post Variances at SFC determines whether labor and burden rate and usage variances are only calculated and posted at the time of work order receipt.

• If set to Yes, labor and burden rate and usage variances are posted whenever shop floor labor feedback transactions are entered

• If set to No, variances are suppressed and not calculated or posted until the work order is received. Because usage variances are calculated based on earned hours, if operations ever span more than one shift without resulting in any items being reported complete, this field should be set to No.

Setting this field to No will reduce the number of variance transactions posted to the general ledger, particularly if there are many shop floor labor transactions processed before material receipts are recorded

The value entered in Work Order Accounting Control displays as the default on all work orders but can be changed manually on each. The exception to this is for routable work orders, which do not default from Work Order Accounting Control; instead they default from the parent work order.

Exercise 1: Review Accounting Records

1   Review Domain/Account Control (36.9.24). Use the next button to cycle through all the screens to ensure that all account fields have a value in them. Not all sub-account or cost center fields will have values. You can uncheck the Verify GL Accounts selection.

2   Review Inventory Accounting Control (36.9.2). In QAD SE this is Inventory Control (3.24). Set the Current Cost field to LAST. This allows the system to update current costs automatically based on the last purchase cost or work order cost and ensures the system will generate variances when these costs differ from the GL or Standard cost. The use of average costing is covered in another course.

3   Review Work Order Accounting Control (36.9.11) (in QAD SE this is Work Order Control) and uncheck the Post Variances at SFC (Shop Floor Control). This will reduce the number of variance transactions generated by the system by waiting until work order close to generate variances. Leaving this field checked will post variances (if there are any) every time shop floor transactions are created. For example a person works all shift on a complex machining operation but does not finish. They record 7.5 hours of work but no units completed. This creates a variance. The variance will be offset once the units are completed but the transaction has already posted. You should consider the nature of your manufacturing operations and the impact of how transactions are made before setting this field.

Enter Item Data

Standard Costing Setup
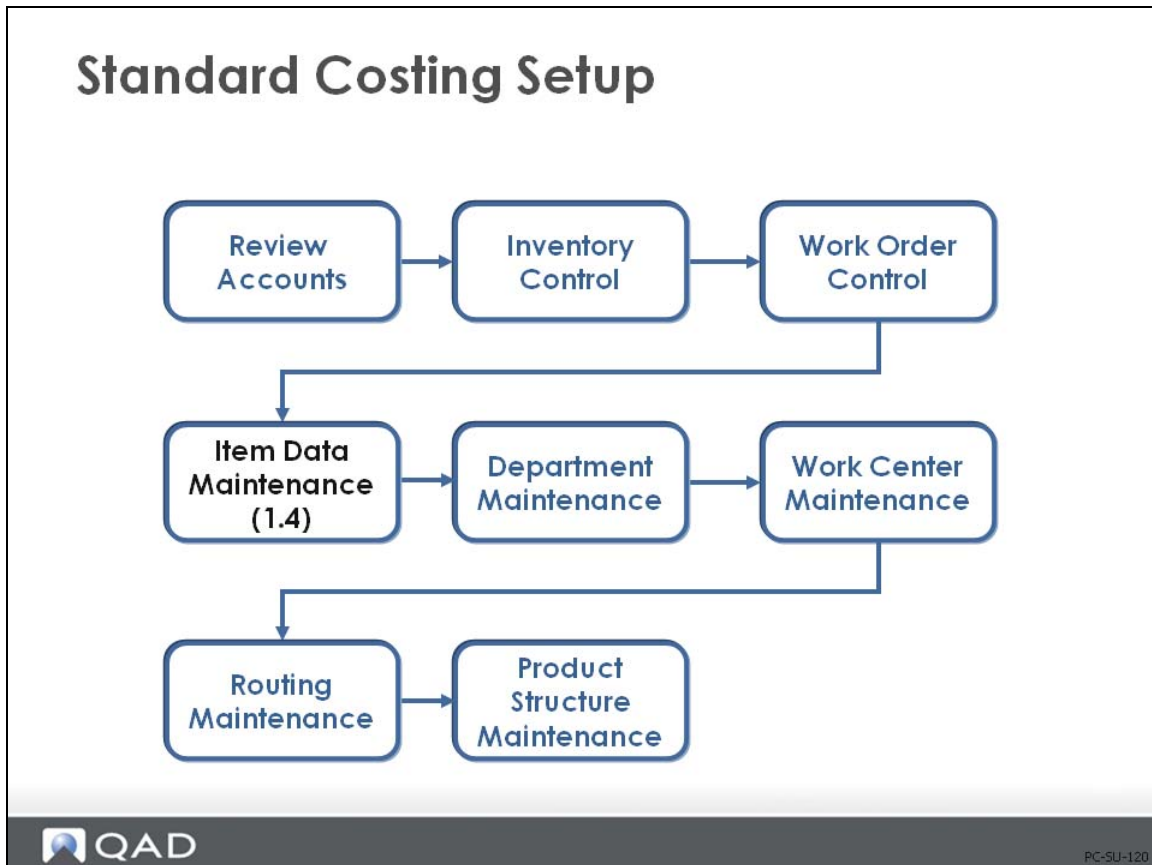
In the Item Data menu (1.4), item data is split into four categories that roughly parallel how companies divide the responsibility for maintaining item data:

General engineering data: Item Master Maintenance (1.4.1), Item Data Maintenance (1.4.3)

Inventory data: Item Inventory Data Maintenance (1.4.5), Item Site Inventory Data Maintenance (1.4.16)

Planning data: Item Planning Maintenance (1.4.7), Item Site Planning Maintenance (1.4.17)

Cost data: Item Cost Maintenance (1.4.9), Item Site Cost Maintenance (1.4.18)

Note   In Item Master Maintenance (1.4.1), you can enter all item data. Access to individual functions can be restricted with security.

Item Planning Maintenance

For costing purposes, the important fields in the planning frame of Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), and Item-Site Planning Maintenance (1.4.17) are the following.

> *Item Number.* Item codes uniquely identify items or products such as raw materials, purchased or manufactured intermediates, finished items, packaging materials, configured products.

Note As soon as an item record is added to the system, if the Item Status code permits, it can be transacted even if no costs are entered. This is a control issue for implementation planning. Also, when you are planning your implementation, consider any security and control issues that apply to access to the Item Master Maintenance (1.4.1).

> *Order Quantity.* The normal order quantity for this item. When manufacturing costs are calculated using Routing Cost Roll-Up (14.13.13), setup costs are divided by this order quantity. If this quantity is left as zero, the system assumes an order quantity of one for cost calculations only.

> *Pur/Mfg.* Product Structure Cost Roll-Up (13.12.13) will be affected by the Pur/Mfg code you assign to the item. The system assumes blank Pur/Mfg codes are [M]anufactured items.

> [P]urchased Item. If your purchased item has a product structure and/or routing associated to it, it is not used in cost roll-up calculations. Instead, this-level labor, burden, and subcontract costs are zeroed out at the next roll-up. All lower-level costs are also zeroed out.

[D]RP item. The same cost calculation logic applies to these items as to purchased items. Any routing or product structure information is for reference only. If you have costed it as a manufactured item and then change it to a DRP (Distribution Requirements Planning) item, the next roll-up zeroes out all rolled costs from lower levels for this site (the default site when using (1.4.7) and the specified site when using (1.4.17), in addition to this-level costs for routing-controlled categories.

[M]anufactured item. Costs are calculated from routing and product structure roll-ups.

[R]outable item. Functions like manufactured item during cost roll-up.

[C]onfigured item. Costs are calculated from Product Structure Cost Roll-Ups if the components on the structure have a structure type code of blank. Configured products have costs calculated during sales order entry for margin calculations.

[F]amily Planning item. Costs are calculated from product structures and routings if the structure type on the components is blank.

The effect of these settings on cost is discussed on page 23.

Issue Policy. Determines whether an item is treated as floor stock.

Yes: This item is issued to work orders.

No: This item is not issued to work orders and requirements print on a different section of the work order picklist under the heading "Floor Stock." These are expense or bulk issue items that might or might not be planned by MRP.

When a work order (or cumulative order) is processed by the Accounting Close, the cost of any floor stock items is debited to WIP and credited to the Floor Stock account specified on the order.

Phantom. Phantoms are often used for transient assemblies or intermediate products - ones that are not (and often cannot) be received into stock but instead go directly into the next higher assembly or product. Phantoms are often used for service items.

Phantom set to Yes identifies this item and its product structure as a phantom

The effect of this setting on cost is discussed on page 26 and page 62 (Engineering Changes).

Yield%. Percentage of any order that is expected to be usable. Can be updated automatically by Routing Cost Roll-up 914.13.13).

The effect of this setting on cost is discussed on page 70.

Routing Code. A code identifying the routing or process normally used in the manufacture of this item. Used only for manufactured items whose default routing/process definition is not stored under the item number.

Use of an alternate can cause a method variance to be calculated at Accounting Close. Usage and rate variances are calculated based upon the work order bill and routing used. If the alternate routing or bill calculates a value different from the standard, a method variance will be charged for the difference. If the values of the primary and alternates are of equal value, there will be no method variance calculated.

BOM/Formula. A code identifying the product structure, formula, and/or co-product/by-product structure normally used to manufacture this item. (For co-products/by-products, this is the base process code.) Used only for manufactured items whose default product structure/formula is not stored under the item number.

Key fields in other Item Data Maintenance frames, and their locations, are noted below.

Product Line (1.4.1), (1.4.3). Each item record must be associated to a product line, which is then used to determine the default accounts for transactions of this item. (The product line accounts are discussed in detail in the Introduction to Costing training guide.)

Status (1.4.1), (1.4.3). Item status can be used to restrict transactions for an item. Use this field in conjunction with Item Status Code Maintenance (1.1.5). Item status typically reflects the life cycle of an item.

Site (1.4.1), (1.4.5) or (1.4.16). The site code identifies the geographical location of inventory. For more precise inventory valuation, transactions are reported by site as well as by entity.

- Each site is associated with a specific general ledger entity, allowing complete financial results to be maintained and monitored by site (or by groups of sites)
- Each site is associated with a specific product line that provides purchasing, inventory, work order and sales account defaults

Effect of Pur/Mfg Code on Cost

Effect of Pur/Mfg Code on Cost

Item A: Pur/Mfg Code = (M) or R

	TL	LL	TOT
Mtl	0.00	15.00	15.00
Lbr	2.50	4.00	6.50
Bdn	3.00	0.00	3.00
Ovhd	2.00	4.00	6.00
Sub	0.00	0.00	0.00

Item A: Pur/Mfg Code = (P) or D

	TL	LL	TOT
Mtl	0.00	0.00	0.00
Lbr	0.00	0.00	0.00
Bdn	0.00	0.00	0.00
Ovhd	2.00	0.00	2.00
Sub	0.00	0.00	0.00

← or →

A

B   C

	B	C
Mtl	5.00	10.00
Lbr	1.00	3.00
Bdn	0.00	0.00
Ovhd	2.00	2.00
Sub	0.00	0.00

Costs for component B and C are rolled up to A's lower-level cost

* After Routing and Product Structure Cost Roll-Ups

M = Manufactured
P = Purchased
TL = This Level; LL = Lower Level

Costs for components B and C are not rolled up to A's lower-level cost

Parent item A's this-level labor and burden costs are zeroed out

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PC-SU-140

This example shows the difference in how a product structure coded as a purchased part rolls up compared to a product structure that is coded as a manufactured or routable part.

- When item A has a Pur/Mfg code of [M]anufactured or [R]outable and blank structure type in the product structure for components B and C, all lower-level costs for material, labor, burden, overhead, and subcontract roll up correctly from the routing and product structure cost roll-up functions. This would also happen if you were to change the code to [R]outable.

- If the Pur/Mfg code were incorrectly changed to [P]urchased for a manufactured item, and the routing and product structure roll-ups were performed, all lower-level costs for material, labor, burden, overhead, and subcontract would be zeroed out. Additionally, this-level costs for labor and burden would also be zeroed out. This would also happen if you were to change the code to [D]RP.

- If we had not rolled up the routing in the second set of data, then this-level labor and burden costs would have remained as they were in the first set of data. Remember, only a routing cost roll-up will affect this-level labor and burden for an item.

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Exercise 2: Effect of Pur/Mfg Code

1 To see the effect of incorrectly changing the Purchase/Manufacture code, use item 01020 Implantable Ultrasound. Review the Product Structure Cost Report (13.12.4) for this item; note the lower level material, labor and burden costs for the 01020.

Note the first level item 50010, the manufactured acoustic transducer.

2   Use Item Planning Maintenance (1.4.7) to change the Purchase/Manufacture code from M to P for the 50010. Use Product Structure Cost Roll-Up (13.12.13). Review the Product Structure Cost Report again; you see that the Roll Up stops at 50010.

```
                              Product Structure Cost Report                          09/23/10 12:36
                                        10USA                                              Page

Site: 10-100    Cost Set: Current

Level  Component Item          Quantity Per Q UM T   Material      Labor       Burden     Overhead  Subcontract   Cost Total
------ --------------------    ------------ - -- - ------------ ------------ ------------ ------------ ------------ ------------
Parent 01020
       Implantable Ultrasound    This Level            0.00      1936.25     6.245125       0.00        0.00      1942.495125
       09/23/10                 Lower Level            0.00         0.00        0.00        0.00        0.00            0.00
                                Unit Total             0.00      1936.25     6.245125       0.00        0.00      1942.495125

1      50010                          1.0   EA
       Acoustic Transducer       This Level            0.00         5.725    0.9387725      0.00        0.20      6.8637725
       09/23/10                 Lower Level       61.4353234       6.0365   0.08659315   6.14353233     0.00     73.70194888
                                Unit Total        61.4353234      11.7615   1.02536565   6.14353233     0.20     80.56572138
                                Ext Total         61.4353234      11.7615   1.02536565   6.14353233     0.20     80.56572138

.2     50011                          1.0   EA
       Ultrasound Array          This Level            0.00         6.0365   0.08659315      0.00        0.00      6.12309315
       09/23/10                 Lower Level       60.5969234         0.00        0.00     6.05969233     0.00     66.65661574
                                Unit Total        60.5969234       6.0365   0.08659315   6.05969233     0.00     72.77970889
                                Ext Total         60.5969234       6.0365   0.08659315   6.05969233     0.00     72.77970889

..3    60010                        233.42   G
       Pepared Layered Mat       This Level       0.25739918        0.00        0.00     0.02573992     0.00      0.28313909
       09/23/10                 Lower Level            0.00         0.00        0.00        0.00        0.00            0.00
                                Unit Total        0.25739918        0.00        0.00     0.02573992     0.00      0.28313909
                                Ext Total        60.08211576        0.00        0.00     6.00821157     0.00     66.09032732

..3    60011                          4.0   EA
       Oscillator Elements       This Level       0.12870191        0.00        0.00     0.01287019     0.00      0.1415721
       09/23/10                 Lower Level            0.00         0.00        0.00        0.00        0.00            0.00
                                Unit Total        0.12870191        0.00        0.00     0.01287019     0.00      0.1415721
                                Ext Total         0.51480765        0.00        0.00     0.05148076     0.00      0.56628841

.2     60012                          6.0   EA
       Electrodes                This Level       0.13973333        0.00        0.00     0.01397333     0.00      0.15370667
       09/23/10                 Lower Level            0.00         0.00        0.00        0.00        0.00            0.00
                                Unit Total        0.13973333        0.00        0.00     0.01397333     0.00      0.15370667
                                Ext Total          0.8384           0.00        0.00     0.08384        0.00      0.92224

1      60009                          1.0   EA
       Probe Housing             This Level      34.21266617        0.00        0.00     3.42126662     0.00     37.63393279
       09/23/10                 Lower Level            0.00         0.00        0.00        0.00        0.00            0.00
                                Unit Total       34.21266617        0.00        0.00     3.42126662     0.00     37.63393279
                                Ext Total        34.21266617        0.00        0.00     3.42126662     0.00     37.63393279

1      60051                          1.0   EA
       Microprocessor            This Level      275.000007         0.00        0.00     27.5000007     0.00     302.5000077
       09/23/10                 Lower Level            0.00         0.00        0.00        0.00        0.00            0.00
                                Unit Total       275.000007         0.00        0.00     27.5000007     0.00     302.5000077
                                Ext Total        275.000007         0.00        0.00     27.5000007     0.00     302.5000077
```

The lower level costs have not been rolled up to the 01020. Only the This Level labor and burden remain. This is caused by the manufactured item 50010 not having any material cost. As it is now coded a P purchased item, the system looks for material cost but finds none.

Go back to Item Planning Data Maintenance and change the Purchase/Manufacture code back to M, then rerun Product Structure Cost Roll Up (13.12.13) and the item roll up will be restored. Check the product structure cost report to ensure the costs have been returned to normal.

Effect of Phantom Field Settings
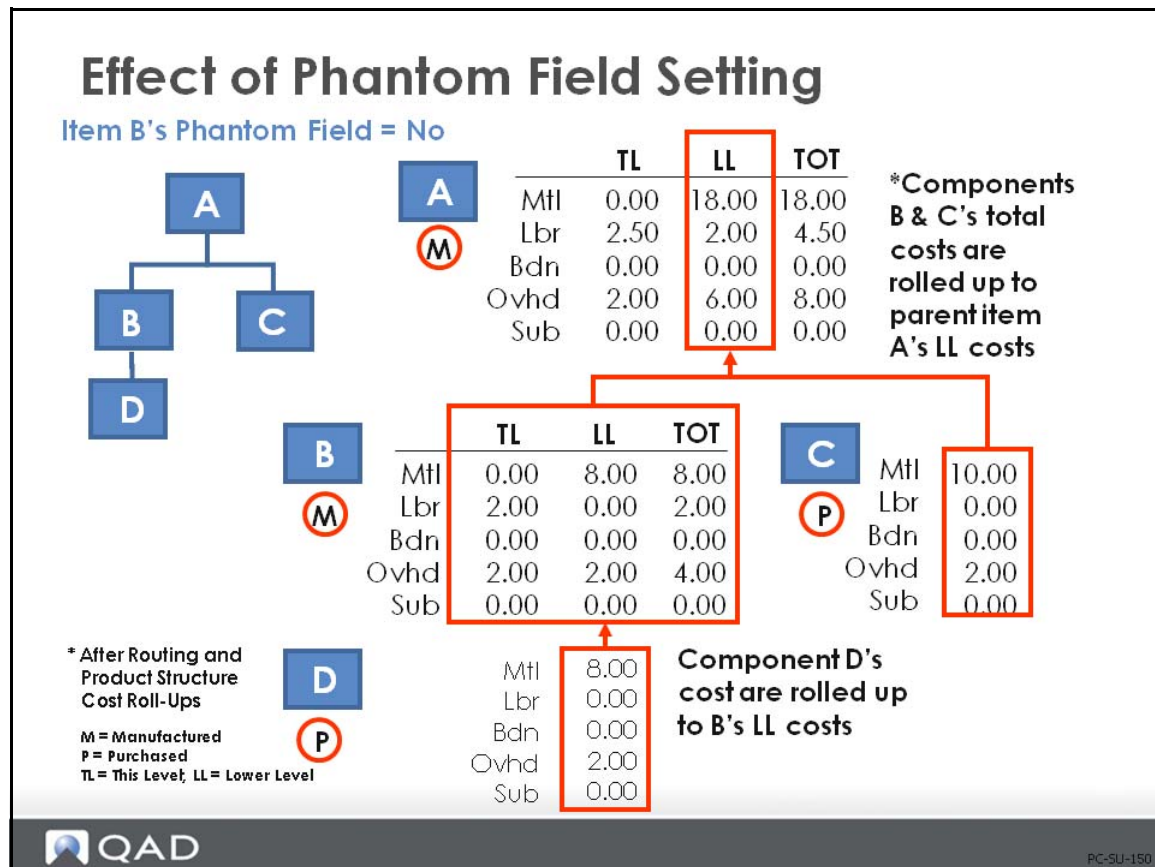
Whether an item is treated like a phantom or not is determined by the Phantom field in the item data menu: Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), or Item Site Planning Maintenance (1.4.17).

Phantom field Set to No

Example The figure above shows material and other costs at the lower level for all the components in the structure. Component B is an assembly with one component (D) that reports to it. Component C is a purchased part. In this first figure of two, we see the cost structure as a standard manufactured item (Phantom field = No).
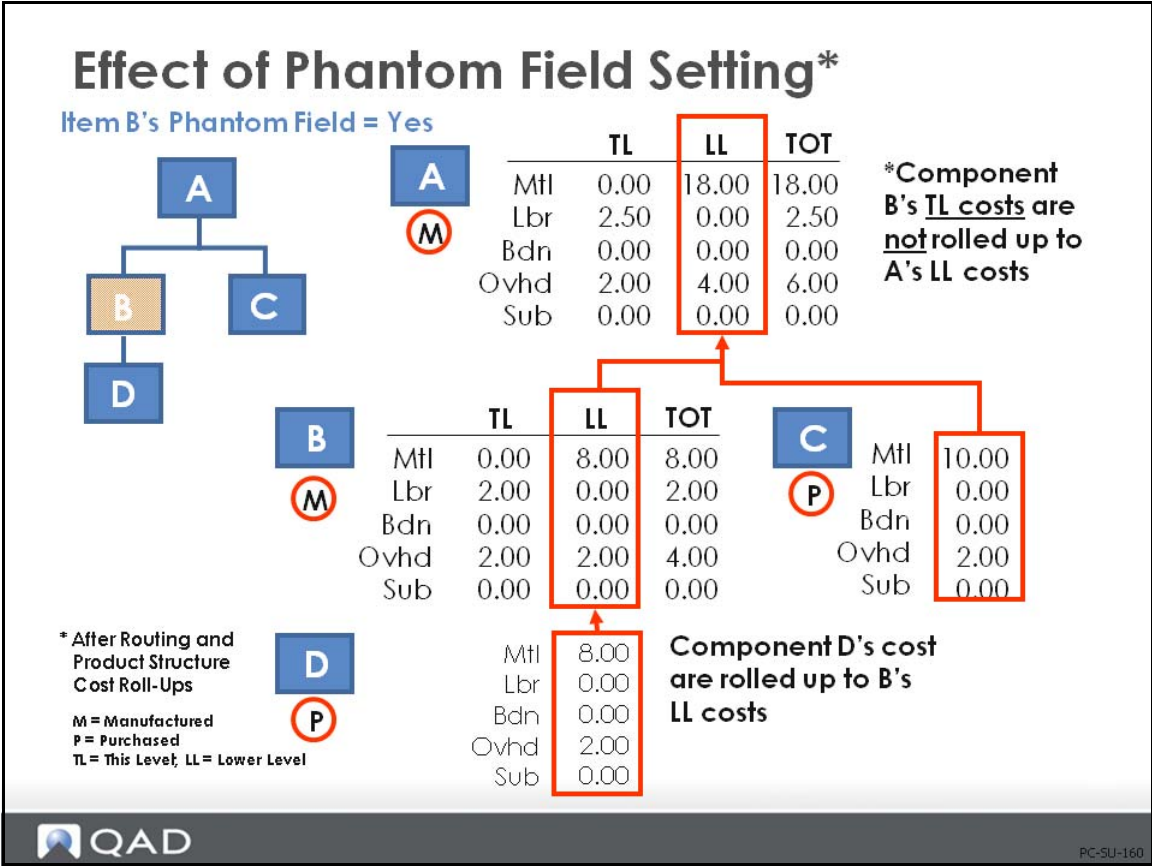
When you set the phantom field in the item data to Yes, that indicates the item is a "global" phantom and is to be treated as a phantom for all product structures it reports to.

The other way that you can set a phantom in a structure is to change the structure type code to X in Product Structure Maintenance (13.5), which indicates that the item is a local phantom and is to be treated as a phantom only in that specific product structure

Routing Cost Roll-Up (14.13.13) will roll up global phantom items. However, the labor, burden, and subcontract costs of a global phantom item are not included in the parent item's cost when the product structure cost roll-up is performed. If you need to build and stock a phantom item, the routing roll-up and the product structure roll-up for the phantom item correctly cost it at this level.

Example   In the figure shown above, we see the difference in cost when the phantom field is set to Yes in the item data. Notice that when B is a phantom, all of item B's this-level costs are excluded from the roll-up.

Warning   Local phantoms (coded as X in the product structure) do have their labor and overhead costs roll up into the parent's costs. The use of local phantoms should be discouraged for this and other reasons. They do not support use-up logic.

Note   Phantom use-up logic, which will be discussed later, whether for global or local phantoms, is not possible in the Repetitive/Advanced Repetitive modules.

Exercise 3: Effect of Phantom Field

Use the same item 01020 to review the effect of the phantom field. Currently, item 50010 is a manufactured item and not a phantom.

Manufacturing Engineering might decide the Acoustic Transducer components can be built directly into the top-level Ultrasound machine without first making the subassembly. However, they still want to keep the structure of the 50010 in case there is a need to build one for repair to a field unit.

Review the Product Structure Cost Report from the previous exercise to see the cost structure of the normal 01020.

1 Use Item Planning Data Maintenance (1.4.7) to select the Phantom option for the 50010.

2 Use Routing Cost Roll Up (14.13.13) then Product Structure Cost Roll Up (13.12.13) for the item 01020. Review the Product Structure Cost Report; it will look like this.

Note that the This Level labor and burden costs for the 50010, 5.725 and 0.9387725 are no longer included in the lower level costs of the 01020, but the other lower level costs are rolled up. For the time being we will leave this phantom structure in place.

Enter Purchased Material Costs

There are three menus you can use to enter purchased material cost data:

1 Item Master Maintenance (1.4.1). Use Item Master Maintenance when, in addition to entering cost data, you also need to enter other item data, such as general data, inventory data, or planning data.

2 Item Cost Maintenance (1.4.9). Use Item Cost Maintenance when you only need to enter cost data. This function is a subset of the series of screens included in Item Master Maintenance (1.4.1).

3 Item-Site Cost Maintenance (1.4.18). Use Item-Site Cost Maintenance, which maintains site-specific item costs, when an item is used at multiple sites. It includes the same cost data fields as Item Master Maintenance and Item Cost Maintenance, but it does not include item price data.

Because the three cost data screens are similar, only the Item Cost Maintenance screen (1.4.9) is shown and discussed.

QAD

Item Cost Maintenance

Enter the item number in Item Cost Maintenance (1.4.9) and scroll through the Item Price Data and GL screens until you reach the current cost data frame. Enter purchased material costs in the this-level field of the current cost set.

Note It is recommended that you initially enter costs in the current cost set so that the GL is not affected. As with any change to the GL cost set, if you have inventory on-hand, you will cause an inventory value change in the GL.

Once you have reviewed the cost entries, move the costs from current to GL by using Current Cost Set Move to GL Set (1.4.22).

Fixed Overhead

Fixed overhead costs are usually allocated to each item based on an estimated production volume. You can enter them manually as a fixed cost per unit for each item by using one of the item data menus or they can be calculated as a percentage of material, labor, burden, and/or subcontract costs by using Item Overhead Cost Update (1.4.21).

Other than overhead, you should not manually enter costs for manufactured items, only purchased items. If you do enter costs for manufactured items, you cannot use the roll-up functions to update these costs.

Overhead and Burden Cost Update
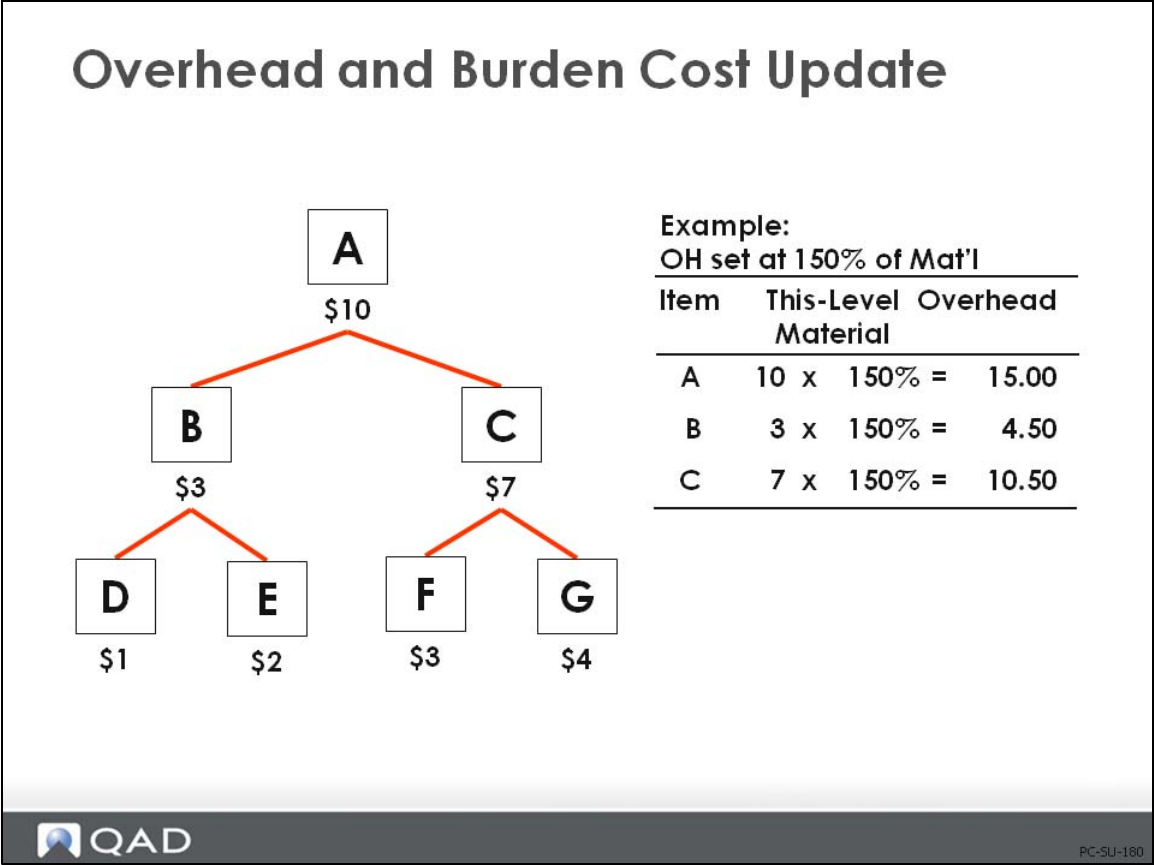
This graphic shows the effect of using Item Overhead Cost Update (shown on the next graphic) to update overhead costs to 150% of the This Level Material cost.

You can calculate overhead and burden as a percentage of lower-level costs by using Item Burden Cost Update (1.4.20), Item Overhead Cost Update (1.4.21), or Item-Element Cost Calculation (30.17.10). This is useful for companies that calculate overhead and burden based on material cost rather than labor cost.

Calculate Overhead and Burden in Three Steps

1   Roll up product structure costs to ensure that you calculate overhead (OH) from accurate lower-level costs. Use Product Structure Cost Roll-Up (14.13.13).

2   Calculate this-level item overhead costs for the lower-level items by using Item Overhead Cost Update (1.4.21). Or calculate this-level item burden by using Item Burden Cost Update (1.4.20).

3   Roll up the product structure costs again to add the calculated overhead to the lower-level costs.

Example   In the previous example, the product structure for item A consists of lower-level items B and C. The lower-level material costs originate in the components for B and C - items D, E, F, and G. This-level overhead is 150% of lower-level material cost. The lower-level material costs are:

>   Item D = $1
>
>   Item E = $2
>
>   Item F = $3
>
>   Item G = $4

- The first product structure cost roll-up for item A calculates lower-level material costs of $3 for item B, $7 for item C, and$10 for item A.

- In Item Overhead Cost Update (1.4.21), set the material percentage to 150% and the other percentages to zero. Set Use This/Lower Level Costs to Lower.

- This calculation generates overhead costs of $4.50 (150% of $3) for item B, $10.50 (150% of $7) for item C, and $15 (150% of $10) for item A. Items D, E, F, & G have OH costs of 0.

- The second product structure cost roll-up adds the calculated this-level overhead costs for items D and E to B, then the costs of F and G to C, then the costs of B and C to A

Processing Considerations

Before running the calculation, consider the following:

- At which level will you calculate overhead? The lowest level parent item? The highest level parent item? The planning level? This decision varies from company to company.

- Which overhead percentage will you use for each level?

  In the item burden and overhead cost update functions, the default percentage is 100%. When calculating lower-level costs, typically change this to 0%.

Exercise 4: Add New Item
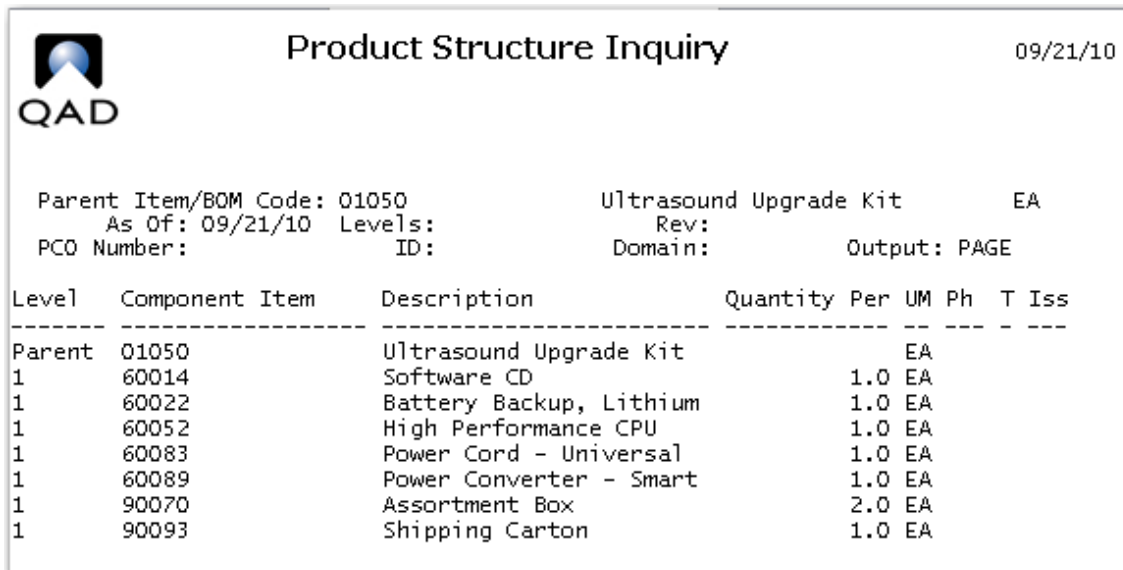
1 Marketing has decided there is demand for a field upgrade kit for older ultrasound machines.

Use Item Master Maintenance (1.4.1) to add a new item, Ultrasound Upgrade Kit, item number 01050, assign it to Product Line 10. The site code should default to 10-100. In the item planning data frame set its Order Quantity to 10 and its Purchase/Manufacture code to M. For the time being no other data need be added.

Note Item 90070 Box Assortment has a default site 10-300, use Item Inventory Data Maintenance (1.4.5) to change the default site to 10-100.

2 Use Product Structure Maintenance (13.5) to add the following components to item 01050: 60014, Software CD; 60022, Lithium Battery; 60052, High Performance CPU; 60083 Power Cord-Universal; and 60089 Power Converter-Smart:

Item Number	Description	Qty	Material Cost
60014	Software CD	1	50.00
60022	Battery Backup, Lithium	1	50.00
60052	High Performance CPU	1	500.00
60083	Power Cord, Universal	1	20.00
60089	Power Converter	2	50.00
90070	Box, Assortment	2	5.00
90093	Box, Shipment	1	10.00

Use Product Structure Inquiry. (13.6) to check your work. It should look like this:

3 Use Item Cost Maintenance (1.4.9) to change the Current Cost Set material cost for the above items per the chart. Be sure to update the current cost set. All of these components are purchased therefore have only the purchase material cost.

4   Use Product Structure Cost Roll Up (13.12.13) to roll up these material costs for the current cost set at site 10-100 for the item 01050. Use the Product Structure Cost Report (13.12.4) to review your work. It should look like the report show here. The total lower level material cost for the top level 10050 is 690.00.

Product Structure Cost Report report image.

5   It has been decided to add an overhead cost of 10% to the cost of purchased materials.

Use Item Overhead Cost Update (1.4.21) set the Pur/Mfg code to P, the site to 10-100, the Cost Set to current, the Cost Element to Overhead and set the Material field to 10%, and the Add To/Replace field to Replace. The Overhead field will be at 100% meaning 100% of the overhead will be 10% of the material cost. Be sure to check the update field, leaving the field unchecked will produce a report showing what will happen if you check the update field. This is useful if you are not sure of the effect of the change you are about to make.

Note in reviewing the report you have updated items in the range of item numbers other than the ones in our product structure.

If you to run the Product Structure Report at this time you would see the Item level Overhead costs but they are not yet rolled up to the top level.

6   Run the product structure cost roll up and review the Product Structure Report for item 01050. It should now look like this.

```
                              Product Structure Cost Report                              09/21/10 12:5
                                         10USA                                                      Pa

Site: 10-100   Cost Set: Current

Level  Component Item          Quantity Per Q UM T    Material        Labor       Burden     Overhead  Subcontract  Cost Total
------ ----------------------- ------------- - -- - ------------ ------------ ------------ ------------ ------------ ------------
Parent 01050
       Ultrasound Upgrade Kit    This Level            0.00         0.00         0.00         0.00         0.00         0.00
       09/21/10                  Lower Level         670.00         0.00         0.00        67.00         0.00       737.00
                                 Unit Total          670.00         0.00         0.00        67.00         0.00       737.00

1      60014                        1.0    EA
       Software CD                This Level          50.00         0.00         0.00         5.00         0.00        55.00
       09/21/10                  Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                 Unit Total           50.00         0.00         0.00         5.00         0.00        55.00
                                 Ext Total            50.00         0.00         0.00         5.00         0.00        55.00

1      60022                        1.0    EA
       Battery Backup, Lithium   This Level          50.00         0.00         0.00         5.00         0.00        55.00
       09/21/10                  Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                 Unit Total           50.00         0.00         0.00         5.00         0.00        55.00
                                 Ext Total            50.00         0.00         0.00         5.00         0.00        55.00

1      60052                        1.0    EA
       High Performance CPU      This Level         500.00         0.00         0.00        50.00         0.00       550.00
       09/21/10                  Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                 Unit Total          500.00         0.00         0.00        50.00         0.00       550.00
                                 Ext Total           500.00         0.00         0.00        50.00         0.00       550.00

1      60083                        1.0    EA
       Power Cord - Universal    This Level          20.00         0.00         0.00         2.00         0.00        22.00
       09/21/10                  Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                 Unit Total           20.00         0.00         0.00         2.00         0.00        22.00
                                 Ext Total            20.00         0.00         0.00         2.00         0.00        22.00

1      60089                        1.0    EA
       Power Converter - Smart   This Level          50.00         0.00         0.00         5.00         0.00        55.00
       09/21/10                  Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                 Unit Total           50.00         0.00         0.00         5.00         0.00        55.00
                                 Ext Total            50.00         0.00         0.00         5.00         0.00        55.00
```

Set Up Departments
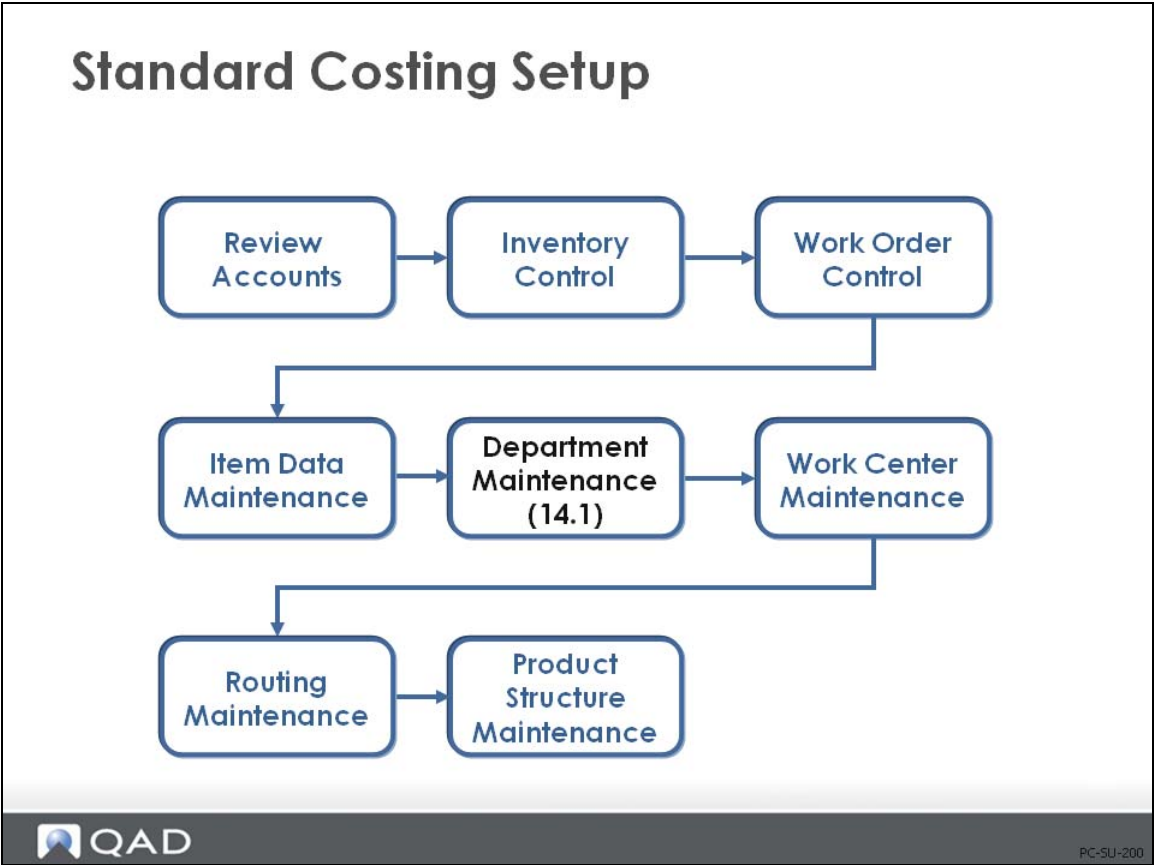
A department is used to group similar work centers. It can have many work centers, but a work center can only report to one department.

Set up departments so that you can review capacity load and costing in a meaningful way. For example, departments can group work centers performing common functions. In a job shop, there can be one department for lathes and another for welding.

Department Maintenance

Default GL accounts are set in the Domain/Account Control (36.9.24). They can be changed here, to allow you to see GL transactions by department.

The system creates GL transactions using the accounts associated with the department code. By changing the department code, different accounts can be used for the GL transactions created by these functions.

For more information, see *QAD Product Costing Introduction Training Guide* for more details on Account Structures and Department accounts.

Work Center Maintenance (14.5)
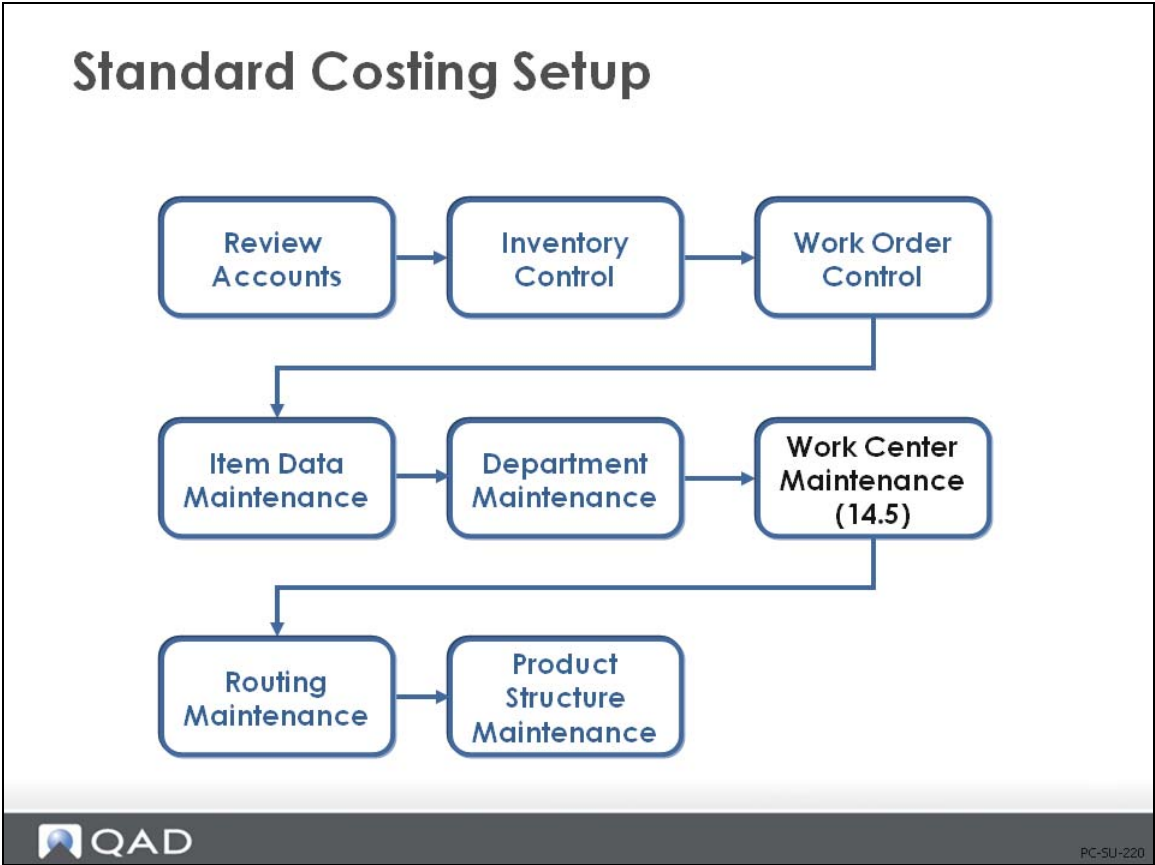
A work center identifies a group of resources (people, machines, production lines, and so on) that are capable of doing the same processes.

Rates are specified at the work-center level. These include the standard labor rates per hour for both setup and run operations, and the variable burden rates that apply to all work done in that work center.

Work Center Maintenance

Most of the fields in Work Center Maintenance are important from a costing perspective:

Mach/Op. Used in calculating burden costs. This value indicates how many machines are to be set up to produce this item. The setup cost will be multiplied by this number to determine the machine burden from setup cost. This is the default value for the same field in Routing Maintenance.

Mach Bdn Rate. Used in calculating burden costs. This is the burden rate per hour applicable to machine run time and setup at this work center.

This value is used by item cost calculations and by labor feedback functions to calculate and post actual costs and variances. It applies to all operations carried out at this work center and cannot be changed for individual operations.

Setup Rate. The total work center labor cost paid per labor hour to set up this work center. Used in calculating labor and labor burden costs.

Labor Rate. The total work center labor cost paid per labor hour to run this work center. Used in calculating labor and labor burden costs.

Example If there are two employees in the work center (Run Crew = 2) and one employee earns $10 per hour and the other employee earns $12 per hour, the labor rate entered would be $22. If both employees earn $12 per hour, then the labor rate entered would be $24

Lbr Bdn Rate or Percentage. The labor burden rate or percentage per hour applicable to both setup and run time at this work center.

Exercise 5: Review Department and Work Center Records

1   Review Department Maintenance (14.1) for department 0400 Assembly. Recall that these are the account codes that will be used to track transactions for all work centers in department 0400.

2   Review Work Center Maintenance (14.5) for work center 1000, General Assembly. Mach/Op should be 1. Change the Mach Bdn Rate to 1.00, the Labor Rate to 5.00 so setup and labor are both 5.00, set the Labor Bdn Rate to zero and the Labor Bdn% to 10%.

Setup Crew:	1.00	Setup Rate:	5.00
Run Crew:	1.000	Labor Rate:	5.00
Machines:	1.000	Labor Burden Rate:	0.00
Mach Bdn Rate:	1.00	Labor Bdn %:	10.00%

Routing Maintenance (14.13.1)

Routings are used to define the steps that a product passes through during the manufacturing process. More importantly, from a costing perspective, routings provide manufacturing setup and run times per operation, machines per operation, and operation yield percent or yield at each operation. Subcontract cost per unit is entered for each subcontracted operation.

Each routing operation is associated with a particular work center, so it is not necessary to enter labor or burden rates for each operation

Routing Maintenance

In Routing Maintenance (14.13.1), enter a routing code, which is typically the item number, and the first operation. (For rate-based routings use Routing Maintenance Rate Based (14.13.2)). The important fields for costing are:

Work Center. Defines the setup, labor, and burden rates to be used in calculating cost at this operation

Machines per Op. Used in cost calculations. Defaults from work center and can be modified. Affects setup cost only; does not affect run cost.

Milestone Operation. Used only in Advanced Repetitive to identify operations for labor and material. If Yes, then reporting of completions, labor, and non-standard components is permitted. Prior non-milestone operations will also be backflushed for labor and components. For more information, see *QAD Advanced Repetitive Costing Training Guide.*

Setup Time. The amount of time in decimal hours that it takes to set up the work center to run the standard lot size of this product.

- If you are using setup times, you need to distribute the cost of the setup normally over more than one unit of product. You can do this by determining a standard lot size for the product and then entering that lot size in the Order Quantity field of item planning, Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), or Item Site Planning on Maintenance (1.4.17).

- A method variance will occur if the actual order size is different than the Order Quantity field in item planning (work orders). Setup labor and burden usage variances will be generated in Advanced Repetitive.
- If setup is not to be included in the cost, leave this setting (or setup rate) at 0.00

Run Time. The amount of time in decimal hours that it takes to produce one unit of this product. Note: You can use Routing Maintenance (Rate Based) (14.13.2) to specify units per hour rather than run time).

Start Date/End Date. Used to move old operations out and new ones into a routing for historical purposes. The roll-up process will roll up costs for only those operations in effect for the date specified in the roll-up screen.

Yield%. The expected percentage of acceptable units that will be completed at this operation. The expected yield for an operation can be expressed as:

*Yield = (Acceptable Units at Operation Completion / Units at Operation Start) * 100*

The total manufacturing yield for a product is determined by multiplying the yield percentages for each of its operations.

*Manufacturing Yield = Yield% for Op 10 * Yield for Op 20 * ...*

The effect of yield on the costing process is discussed in more detail on page 70.

Subcontract Cost. The standard cost per unit that subcontractors charge to perform this operation. Subcontract Cost is discussed in more detail later in the course.

Use Item Planning Maintenance (1.4.7) or Item Site Planning Maintenance (1.4.17) to specify the Routing Code to be used for an item. For example it is common for the same item manufactured at two sites to use site specific routes, which might call for different work centers or different run times.
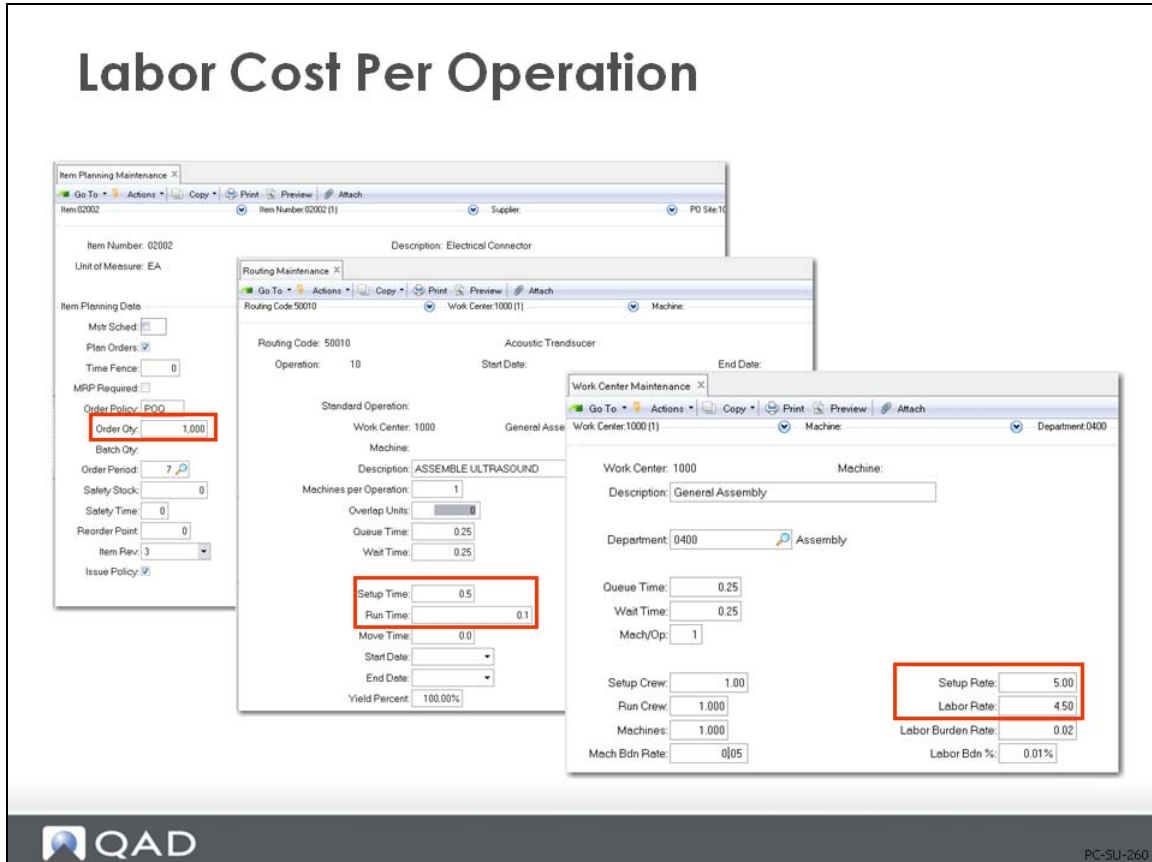
Item Planning Maintenance (1.4.7)

Routing Maintenance (14.13.1)

Work Center Maintenance (14.5)

What Labor Costs per Operation Are Based On

Labor costs are calculated from the item's routing. The total labor cost is the combined cost to set up the operation and the cost to run that operation.

- Setup cost is the setup time multiplied by the setup rate at the work center. Since the work center only has to be set up once, the total setup cost is divided over all of the items in a batch - identified by the item's order quantity specified in Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), or Item Site Planning Maintenance (1.4.17). If no order quantity is entered for an item, it defaults to one.
- Setup Cost = *Setup Hrs/Order Qty * WC Setup Rate*
- Run Cost = *Run Hrs per unit * WC Labor Rate*
- Total Cost = *Setup Cost + Run Cost*
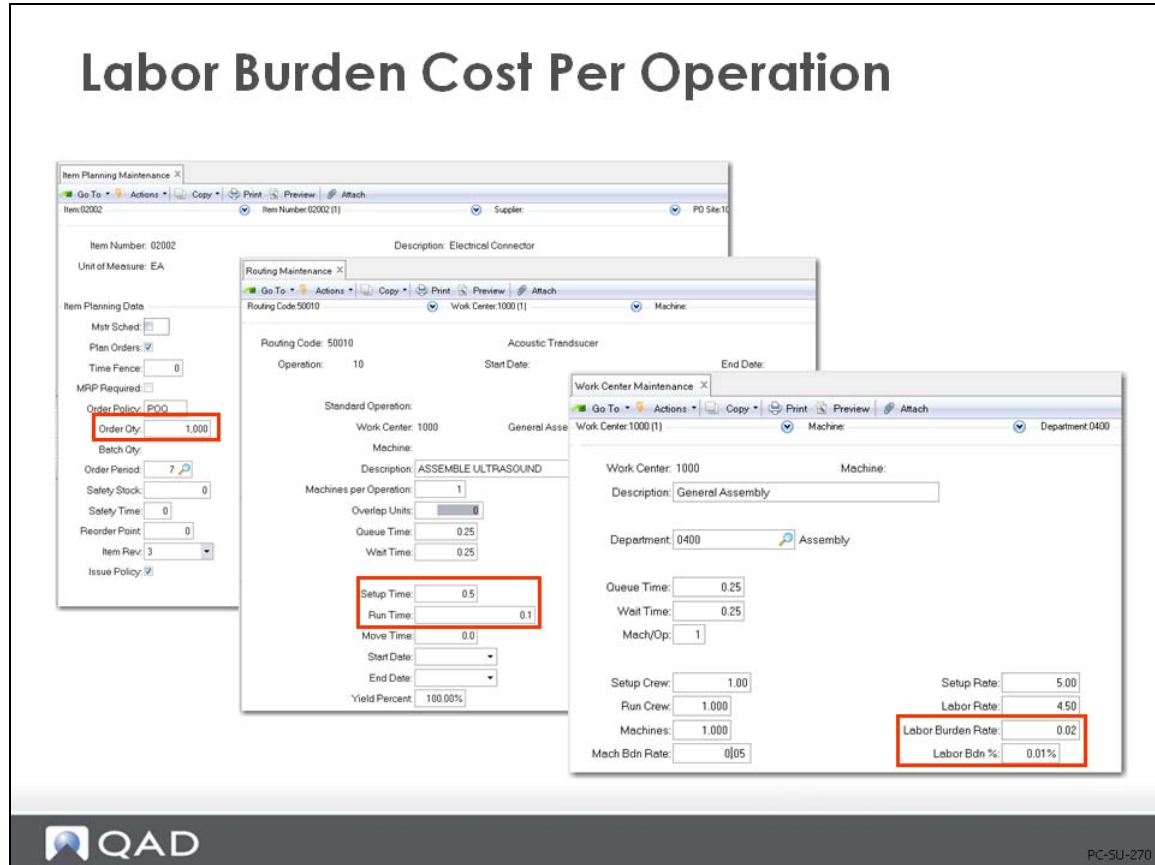
Item Planning Maintenance (1.4.7)

Routing Maintenance (14.13.1)

Work Center Maintenance (14.5)

What Labor Burden Costs Are Based On

Burden costs apply to both setup and run time. Labor burden is calculated as a rate per labor hour and/or a percentage of the total labor cost. This is most commonly used in a labor-intensive environment. Both types of burden can be applied: as a rate per hour and/or as a percentage of labor cost.

- Setup Labor Burden Rate =

  [(Setup Hrs / Order Qty) * Work Ctr Lbr Burden Rate] / Item Yield%

- Setup Labor Burden Percent =

  [(Setup Hrs / Order Qty) * Work Ctr Setup Rate * Work Ctr Lbr Burden%] / Item Yield% Run Labor Burden Rate =

  (Run Hrs * Work Ctr Labor Bdn Rate) / Item Yield%

- Run Labor Burden Percent =

  (Run Hrs * Work Ctr Labor Rate * Work Ctr Labor Burden%) / Item Yield%

Machine Burden Cost Per Operation
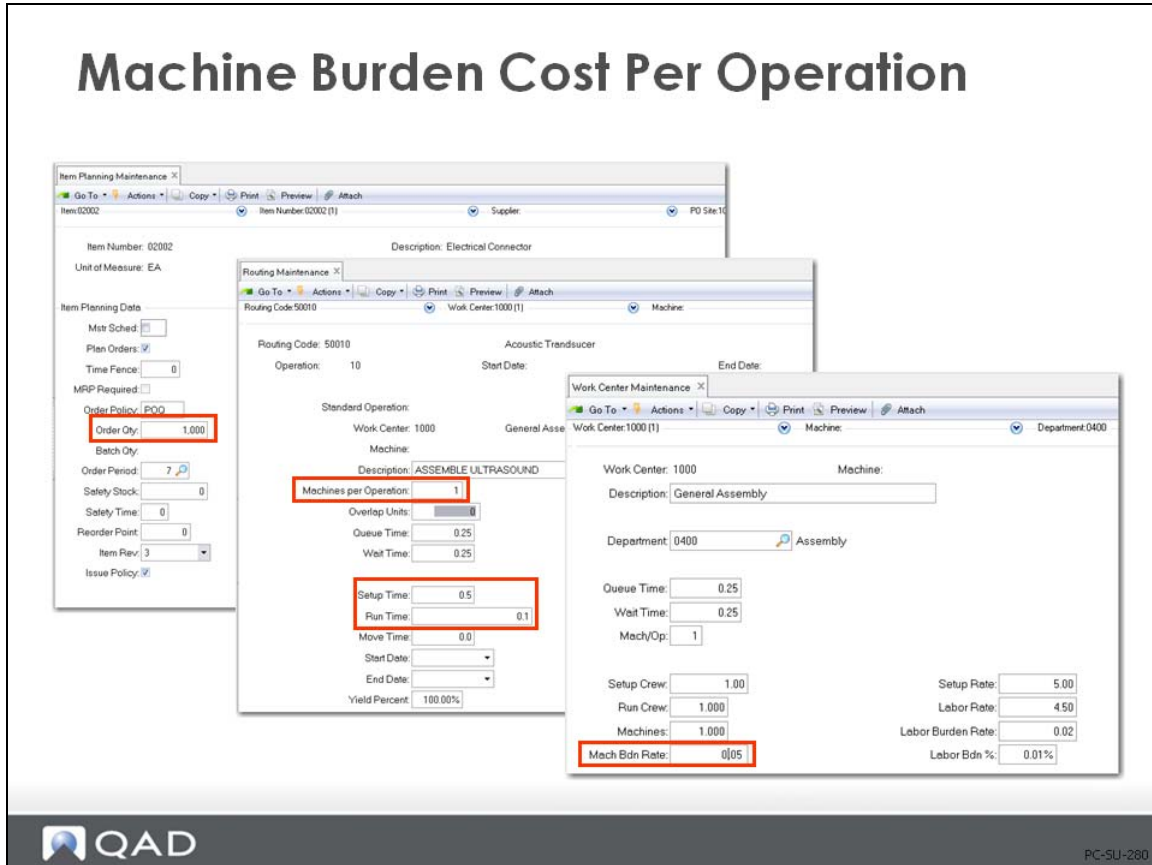
PC-SU-280

Item Planning Maintenance (1.4.7)

Routing Maintenance (14.13.1)

Work Center Maintenance (14.5)

What Machine Burden Costs Are Based On

The final source of burden is machine burden. This is calculated based on the number of hours the machine is in use - both while it is being set up and while products are being run. As in the other burden cost calculations, the machine burden cost associated with set up is divided over the item's order quantity. When there are multiple machines per operation, any machine setup burden cost is applied to each individual machine. This is most commonly used in a machine-intensive environment.

- Machine Setup Burden =

  *[(Setup Hrs / Order Qty) * Mach Bdn Rate * Machines / Op] / Item Yield%*

- Machine Run Burden =

  *(Run Hrs * Mach Burden Rate) / Item Yield%*

- Machine Burden =

  Machine Setup Burden + Machine Run Burden

There is only one field for run time on the routing. It is not split into machine time and labor time. For burden calculations, the machine and the labor are both assumed to be in use for the entire run time.

Note To report strictly by machine-based hours, an employee record needs to be created for that machine. Use Employee Create (36.1.7.1).

Exercise 6: Add Routing

1 The routing for the upgrade kit involves packing the CPU and the CD into an assortment box, then, placing the battery, power converter and power cord into a second assortment box. The last operation is placing the two boxes into a shipping carton.

Use Routing Maintenance (14.13.1) to add routing operations for the 01050 Upgrade Kit. Use Routing Code 01050. Be careful NOT to use the Standard Operation field. Note: The use of standard operations is covered in the course on work centers and routings. They are costed the same as any other routing operation.

Op No.	W.C.	Description	Setup	Run
10	1000	Assy CPU & CD into box	0.25	0.25
20	1000	Assy Batt, Conv & Cord Into Box		0.25
30	1000	Assy boxes into carton		0.25

The other fields in Routing Maintenance can be left at default values for now.

Use Routing Inquiry to review your work, it should look like this.

```
                    Routing Inquiry                    09/21/10

QAD

Routing Code: 01050         Ultrasound Upgrade Kit
  Effective: 09/21/10                         Output: PAGE

  Op Work Center          Machine   Setup    Run Time   Move  Yield%
----- --------------------- -------- ------- ------------- ------- -------
  10 1000 General Assembly             0.25          0.25   0.0 100.00%
       Assy CPU & CD into box
  20 1000 General Assembly             0.0           0.25   0.0 100.00%
       Assy batt, conv, & cord
  30 1000 General Assembly             0.0           0.25   0.0 100.00%
       put boxes into carton
```

2 Use Product Structure Maintenance to add the operation at which each component is used to the product structure. In order to have the box 90070 set up at two different operations you add a reference code, to keep it simple make the reference code the same as the operation number. Your Product Structure Maintenance screen should look like this when you are done.

3   The Product Structure Inquiry now shows the assortment box, 90070, twice, at one each, rather than two as it did earlier. It does not show the operation number.

```
QAD                 Product Structure Inquiry                    09/21/10


   Parent Item/BOM Code: 01050              Ultrasound Upgrade Kit          EA
          As Of: 09/21/10   Levels:              Rev:
   PCO Number:                  ID:            Domain:         Output: PAGE

Level   Component Item    Description            Quantity Per UM Ph  T Iss
-------  ------------------  ------------------------  ------------ -- --- - ---
Parent  01050             Ultrasound Upgrade Kit                EA
1       60014             Software CD                    1.0 EA
1       60022             Battery Backup, Lithium        1.0 EA
1       60052             High Performance CPU           1.0 EA
1       60083             Power Cord - Universal         1.0 EA
1       60089             Power Converter - Smart        1.0 EA
1       90070             Assortment Box                 1.0 EA
1       90070             Assortment Box                 1.0 EA
1       90093             Shipping Carton                1.0 EA
```

The Product Structure by Item Report displays all fields of the product structure and a couple from the item master, the phantom field and the issue policy field. The details of all the available fields in product structures are covered in the course on Product Structures.

```
QAD                   Product Structure by Item Report                09/22/10 11:
                                 10USA                                        Pa

Level      Component Item   Reference   Description         Quantity Per UM   Op Ph  T Iss Start Eff End Eff    Scrap LTO
----------  ------------------ ------------  ------------------------  ------------ -- ------ --- - --- --------- -------- ------- ---
Parent     01050                         Ultrasound Upgrade Kit                EA
1          60014                         Software CD                    1.0 EA   10
1          60022                         Battery Backup, Lithium        1.0 EA   20
1          60052                         High Performance CPU           1.0 EA   10
1          60083                         Power Cord - Universal         1.0 EA   20
1          60089                         Power Converter - Smart        1.0 EA   20
1          90070            10           Assortment Box                 1.0 EA   10
1          90070            20           Assortment Box                 1.0 EA   20
1          90093                         Shipping Carton                1.0 EA   30
```

4 In order for the operation details to be reflected in the item cost you need to roll up the route, then roll up the product structure again. Use Routing Cost Roll Up (14.13.13) then Product Structure Cost Roll Up (13.12.13). Review the Product Structure Cost Report, it should now reflect This Level labor and burden for the 01050.

```
                          Product Structure Cost Report                      09/21/10 15:21
                                    10USA                                            Page

Site: 10-100   Cost Set: Current

Level  Component Item          Quantity Per Q UM T    Material       Labor       Burden      Overhead  Subcontract   Cost Total
------ ------------------------ ------------ - -- - ------------ ------------ ------------ ------------ ------------ ------------
Parent 01050
       Ultrasound Upgrade Kit   This Level              0.00        3.875       1.1625        0.00         0.00        5.0375
       09/21/10                 Lower Level           690.00        0.00        0.00         69.00         0.00      759.00
                                Unit Total            690.00        3.875       1.1625       69.00         0.00      764.0375

1      60014                          1.0   EA
       Software CD              This Level             50.00        0.00        0.00          5.00         0.00       55.00
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total             50.00        0.00        0.00          5.00         0.00       55.00
                                Ext Total              50.00        0.00        0.00          5.00         0.00       55.00

1      60022                          1.0   EA
       Battery Backup, Lithium  This Level             50.00        0.00        0.00          5.00         0.00       55.00
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total             50.00        0.00        0.00          5.00         0.00       55.00
                                Ext Total              50.00        0.00        0.00          5.00         0.00       55.00

1      60052                          1.0   EA
       High Performance CPU     This Level            500.00        0.00        0.00         50.00         0.00      550.00
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total            500.00        0.00        0.00         50.00         0.00      550.00
                                Ext Total             500.00        0.00        0.00         50.00         0.00      550.00

1      60083                          1.0   EA
       Power Cord - Universal   This Level             20.00        0.00        0.00          2.00         0.00       22.00
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total             20.00        0.00        0.00          2.00         0.00       22.00
                                Ext Total              20.00        0.00        0.00          2.00         0.00       22.00

1      60089                          1.0   EA
       Power Converter - Smart  This Level             50.00        0.00        0.00          5.00         0.00       55.00
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total             50.00        0.00        0.00          5.00         0.00       55.00
                                Ext Total              50.00        0.00        0.00          5.00         0.00       55.00

1      90070                          2.0   EA
       Assortment Box           This Level              5.00        0.00        0.00          0.50         0.00        5.50
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total              5.00        0.00        0.00          0.50         0.00        5.50
                                Ext Total              10.00        0.00        0.00          1.00         0.00       11.00

1      90093                          1.0   EA
       Shipping Carton          This Level             10.00        0.00        0.00          1.00         0.00       11.00
       09/21/10                 Lower Level            0.00        0.00        0.00          0.00         0.00        0.00
                                Unit Total             10.00        0.00        0.00          1.00         0.00       11.00
                                Ext Total              10.00        0.00        0.00          1.00         0.00       11.00
```

Subcontract Cost per Unit
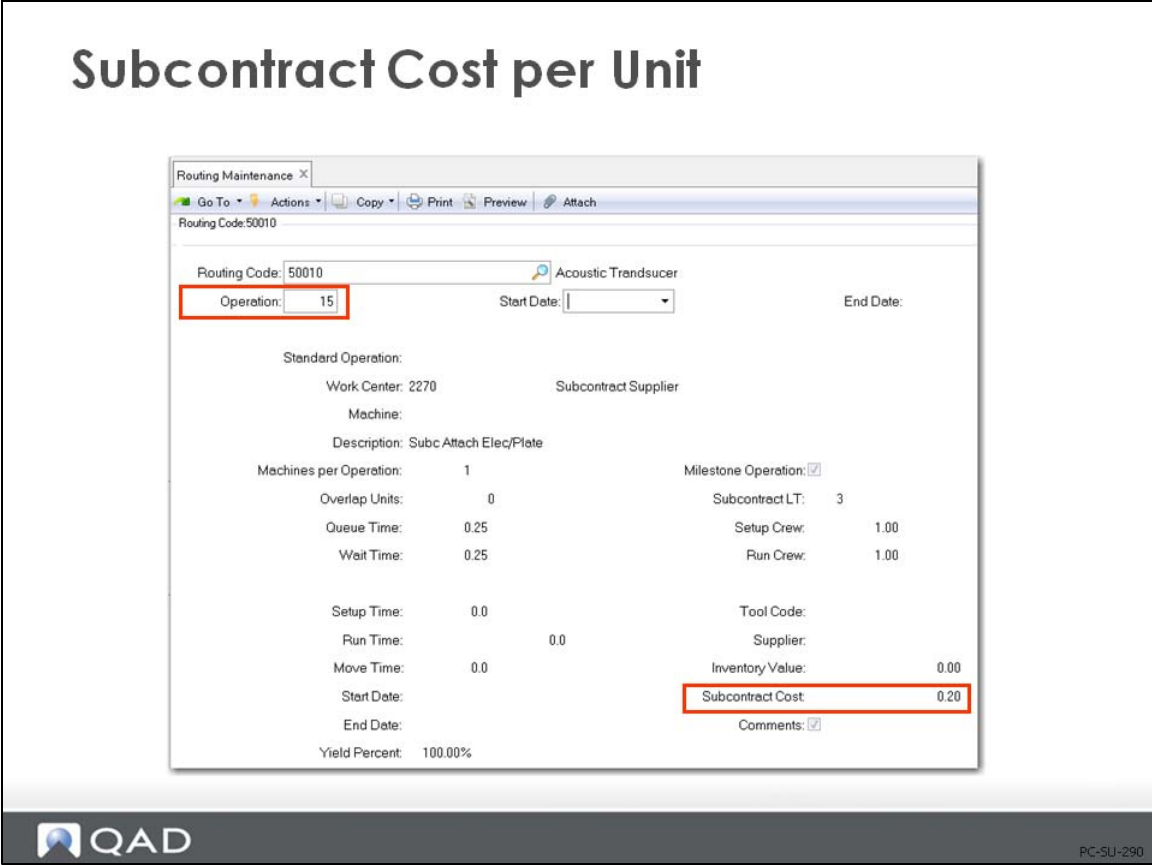
Subcontract costs are entered in Routing Maintenance (14.13.1) at the step or operation at which the outside processing will be performed. The cost is entered as the standard charge from your subcontract supplier for performing the work. You can have multiple subcontract operations in a routing.

Actual management of subcontract processing requires that the work order be linked to a subcontract purchase order if you want to have charges applied to specific work orders. When the purchase order is received, the inventory accounts are not affected. Instead the standard subcontract cost is debited to Work in Process, and the PO amount is credited to PO Receipts. Any variance between the standard subcontract cost and the PO amount is calculated as a subcontract rate variance and posted accordingly.

If you open a subcontract purchase order and don't link it to a specific work order, then the cost of the subcontract will be debited to Cost of Production instead of Work in Process.

Subcontract Routing/OP PO Maintenance

Use Subcontract Routing/Op PO Maintenance to specify discrete subcontract purchase orders for a specific routing and operation.

If your company uses more than one subcontractor for the same routing and operation, you can enter multiple subcontract purchase orders in the Purchase Orders frame.

When you specify subcontract purchase orders for a specific routing and operation, the system uses the information to find the subcontract purchase orders and automatically update the cumulative ID and operation when an Advanced Repetitive transaction creates a cumulative ID.

Line. Enter the purchase order line number associated with this subcontract routing/operation purchase order record. If you do not enter a supplier ID, you must enter both the purchase order number and the line number. When you do this and click Next, the system suppliers the supplier ID.

Routing Cost Report

The Routing Cost Report (14.13.14) displays the costs calculated by operation for selected routings. These routings might or might not be attached to an item, so it is always necessary to specify an Order Quantity against which setup costs can be amortized. These reports can optionally display all operations for a work center.

Item Routing Cost Report

Item Routing Cost Report (14.13.15) shows all routing costs for an item and/or work center.

Exercise 7: Subcontract & Routing Cost Report

1   The item 50010 which you used for the Phantom item exercise has a subcontract operation 15 for electroplating. A good place to see this is the Routing Cost Report (14.13.14). Run this report for item 50010.


Note the subcontract cost for operation 15. This is also shown on the Product Structure Cost Report you used in the Phantom exercise. Subcontract operations are costed the same as any purchased item.

2   The Product Structure Cost Report only shows the total labor and burden. Run the Routing Cost Report for item 01050 with the order quantity set to 10. Remember you are looking at per unit costs based on an order quantity of 10. Thus each unit has one tenth of the setup cost. This report shows the setup cost, the run cost and the burden costs for each operation.

In this example you see the total setup cost of 1.25 (0.25hr * 5.00/hr setup rate).

At operation 10 the run cost is 1.25 (0.25hr * 5.00/hr labor rate).

At operation 10 the per unit set up cost (setup cost/order qty) = (1.25/10) = 0.125 is added to the run cost to get the total labor cost at operation 10 of 1.375.

The labor burden is 10% of the labor cost based on the work center or 0.1375.

The machine burden is the (mach. Bdn rate * run time hrs) + (mach. Bdn rate * setup hrs/unit) or (1X0.25 + 1X0.25/10) = (0.25 +0.025) = 0.275.

Product Structure Maintenance (13.5)
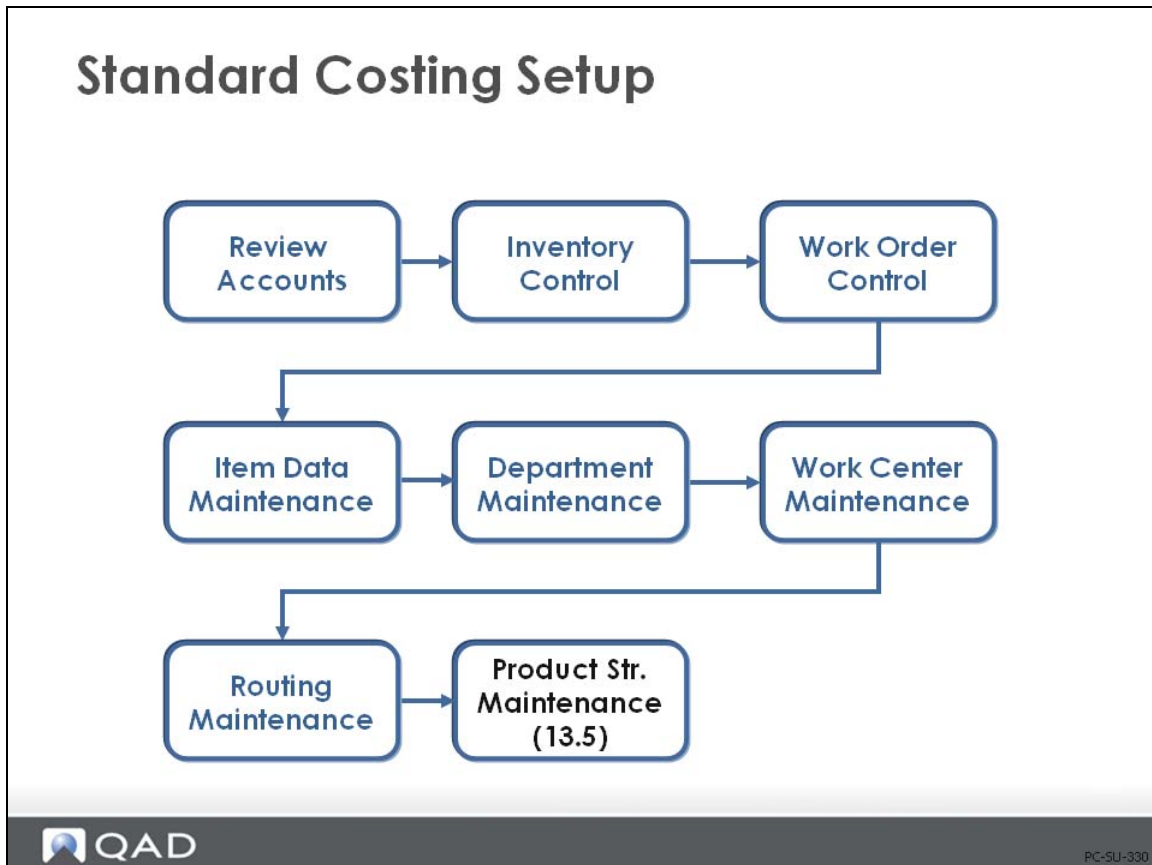
Product structures attach the components to the parent and define the quantity to use. As you will see in the next chapter, QAD Enterprise Edition uses the product structure cost roll-up process to calculate lower-level costs.

Product Structure Maintenance

Effective, from/to. Provides date effectivity. Only those items effective for the date selected will be costed.

Next year's structure changes can be input with effective dates of next year so as to not impact this year's costs.

Note Product structure cost roll-up can be performed as a specific effective date and most cost reports can be run by effective date as well.

Qty Per. Defines how many of the component, in its unit of measure, are required to make one of the parent, in its unit of measure.

Structure Type. The structure type defines how this parent/component or BOM/Formula relationship is used. Values can be blank, A, D, J, X, P, or O.

[blank]: Normal product structure relationship. The Structure Type field normally should be left blank on most parent/component or BOM/Formula relationships. These structures are used by manufacturing planning and control, and product costing. The cost roll-up process will not add the cost of this component to the parent if a value of A, D, J, P, or O is entered.

[A]lternate: Set by the system as an identifier for an alternate structure.

[D]ocumentation only in the structure. Is not rolled up for costing.

[J]oint: Indicates a co-product/by-product relationship. A co-product/by-product relationship cannot be modified using Product Structure Maintenance (13.5) or Formula Maintenance (15.5).

[X]: Local phantom. Adds this-level cost to the parent, as well as its component's cost. (A global phantom adds only lower-level costs to the parent.) Phantom codes are discussed in "Effect of Phantom Field Settings" on page 26.

[P]lanning item on a planning bill: Costs for items with this code are not included in rolled costs.

[O]ptional item, normally on a configured product, but can also be used on a planning bill. Costs for items with this code are not included in rolled costs.

Scrap. Scrap is the inverse of yield and is used here to indicate the expected additional quantity of this item required to produce the parent.

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 - for example, an engine - and you have a requirement for 80 engines, the system calculates the demand quantity to be 81.6. You can enter an Order Multiple in Item Planning Maintenance (1.4.7) or Item-Site Planning Maintenance (1.4.17) to ensure you get discrete order quantities. Also note that the work order BOM and repetitive backflush component requirement and issue quantities are inflated by the Scrap percentage.

Scrap is by specific component and is always costed as:

*Component Cost / (100% - Scrap%) * Quantity Per = Extended Total / Component*

(See page 70 for more information on scrap.)

Op. The routing or process operation at which this component is used. Do not leave this blank if you are using "loss" costing (see page 70) or Advanced Repetitive/Repetitive.

For repetitive environments: Determines whether this component is backflushed. If you enter the operation number here, this component is automatically issued (backflushed) when you report quantities for the parent in Advanced Repetitive and Repetitive labor and scrap reporting transactions. If Op is [blank], or does not match a defined operation, this component is not backflushed.

For loss costing: This field enables component yield cost calculations. Both Product Structure Cost Roll-Up (13.12.13) and Routing Cost Roll Up (14.13.13) use this field when calculating material costs: if the operation yield is less than 100% in Routing Maintenance (14.13.1), then material costs are increased to reflect yield loss. If Op is [blank], QAD Enterprise Applications assumes components are issued at the first operation.

Basic Product Structure Material Cost Calculations

For each component in the structure:

*Qty Per * Component Cost = Extended Total / Component*

Continued: Product Structure Maintenance screen for the 01010 Medical Ultrasound.

Engineering Changes in Product Structure (Material Costs)
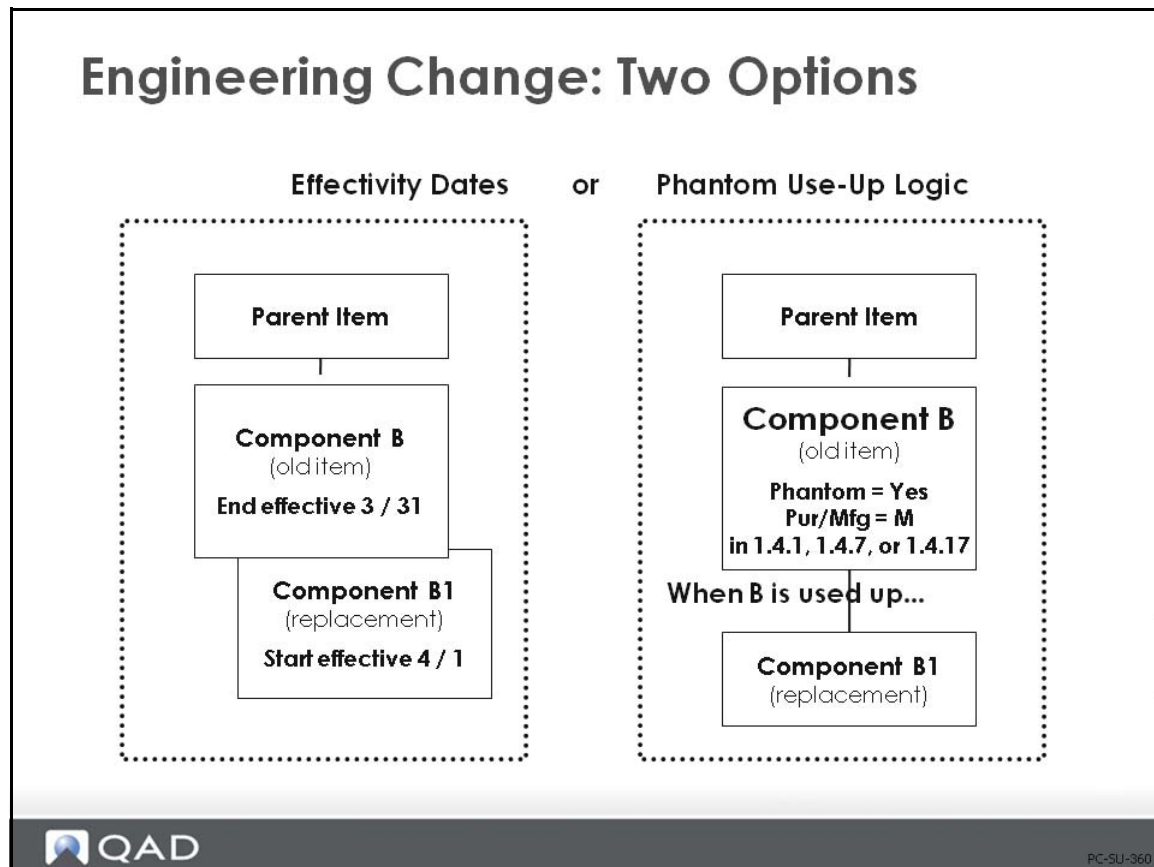
Effectivity Dates

When components need to be added or deleted from a product structure, you should manage this with the start and end effective dates in Product Structure Maintenance (13.5).

Important Do not delete an item from a product structure if you need to maintain history on product structure over time

You can specify when the old component will no longer be used in the product and when the new component will start being used. Product Structure Cost Roll Up (13.12.13) can be performed as of a specific effective date, and most cost reports can be run by effective date as well.

Another way to phase-in engineering changes is with phantom use-up logic, which is described on the next page.

Phantom Use-Up Logic

Sometimes it is difficult to project when you will run out of a component that you will replace with a new component. In order to simplify the planning control of this item, phantom use-up logic can be applied. Basically, you create a product structure record for the old component, which has the new component reporting to it, and make the old component a phantom by setting the Phantom field to Yes in Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), or Item Site Planning Maintenance (1.4.17). As long as the old component is on-hand, planning and work orders will continue to use it up.

Phantom use-up logic must be applied globally, rather than locally, wherever the old component is used, with the Phantom field set to Yes. This can have an effect on cost.

> If the product structure is rolled up, the cost of the new component is used even though you might not actually be issuing it yet.

> If the product structure is not rolled up, you will have a cost variance as soon as the new component is used, unless, of course, your new component cost equals the old component cost.

Example

In the slide, item A's component B is going to be replaced by component D when B has been used up. So a product structure for component B is created, calling for component D at a Quantity Per of one and the Phantom field on component B is changed in the item planning data to Yes. Item B also has a Pur/Mfg code of [M]anufactured.

The data in the slide shows how the product cost for A will change if the routing and structure are rolled up after the Phantom field is set.

The this-level cost of B is not included any longer in the cost of A. It has been replaced by the cost of D. (Use care if you are replacing a manufactured item, which has lower-level costs, with a purchased item.)

If you are still issuing B, you will incur an unfavorable material variance in the work order in this example. If you do not roll up the costs due to frozen standards, then when you start using D, you will incur a favorable variance.

Exercise 8: Engineering Change in Product Structures

1   The latest upgrade to the software exceeds the capacity of a CD disk, necessitating a change to a DVD disk. Marketing is anxious to implement the change as soon as possible.

     Use Item Master Copy 1.4.12 to copy the current Software CD, 60014, to a new item number 60014.1 Software DVD. Cycle through the screens for the copy function, until you reach the Current Cost Set screen and change the material cost of the DVD to 55.00, all other attributes for the DVD are the same as the CD.

2   Use Product Structure Maintenance to set the End Date of the 60014 to next Sunday. Add the item 60014.1 to the structure at operation 10 with a Start Date of next Monday. Your Product Structure Maintenance screen should look like this.

Component	Description	Unit of Measure	Reference	Quantity	Start Date	End Date	Operation	BOM Code
⊟ 01050	Ultrasound Upgrade Kit	EA		1				01050
60014	Software CD	EA		1		9/26/2010	10	60014
60014.1	Software DVD	EA		1	9/27/2010		10	60014.1
60022	Battery Backup, Lithium	EA		1			20	60022
60052	High Performance CPU	EA		1			10	60052
60083	Power Cord - Universal	EA		1			20	60083
60089	Power Converter - Smart	EA		1			20	60089
90070	Assortment Box	EA	10	1			10	90070
90070	Assortment Box	EA	20	1			20	90070
90093	Shipping Carton	EA		1			30	90093

3   Review the Product Structure Cost Report for the 01050 using the default As Of Date: (today's date) you see the costs as of today. The CD cost of 50.00 rolled up to the lower level cost of the 01050. Remember you are using the Current Cost set.

     Run the report again setting the As Of Date to next Monday. Now you see the new item 60014.1 and it's cost of 55.00. Because you have not yet done the Cost Roll Up the new cost is not yet reflected in the cost of the 01050. Note: The date shown on the report header is the date the report was run. The As Of Date is displayed in the report trailer.

```
Product Structure Cost Report...  ✕

                    Product Structure Cost Report                    09/22/10 14:31:2
                              10USA                                          Page:

Site: 10-100   Cost Set: Current

Level  Component Item            Quantity Per Q UM T   Material      Labor      Burden    Overhead  Subcontract   Cost Total
------ -------------------------- ------------- - -- - ------------ ------------ ------------ ------------ ------------ ------------
Parent 01050
       Ultrasound Upgrade Kit    This Level           0.00        3.875       1.1625      0.00        0.00        5.0375
       09/21/10                  Lower Level          690.00      0.00        0.00        69.00       0.00        759.00
                                 Unit Total           690.00      3.875       1.1625      69.00       0.00        764.0375

1      60014.1                        1.0   EA
       Software DVD              This Level           55.00       0.00        0.00        5.00        0.00        60.00
       09/22/10                  Lower Level          0.00        0.00        0.00        0.00        0.00        0.00
                                 Unit Total           55.00       0.00        0.00        5.00        0.00        60.00
                                 Ext Total            55.00       0.00        0.00        5.00        0.00        60.00
```

     If you were going to make this change permanent you would now run the cost roll up sequence. However marketing has learned there are a large number of CDs in inventory and have decided to use those up before switching to the DVD.

Exercise 9: Engineering Change using Phantom Use Up Logic

A definition of a phantom item is a non-stocked subassembly. The assumption is that you choose to not carry the phantom item in stock. The phantom logic therefore says; if a phantom item is in stock it should be issued to all requirements until consumed at which point the system would again issue the components of the phantom.

You can use this logic to ensure all current stock of an item is consumed, then, automatically switch to issuing a new item. Set up the product structure of the 01050 to consume the current CD until all stock is gone then switch to the DVD.

1   Use Product Structure Maintenance for the 01050, delete the end date from the 60014 and delete the 60014.1 from the structure.

2   Create a new product structure for the 60014 with the 60014.1 as its only component.

3   Use Item Planning Maintenance (1.4.7) to change the 60014 Purchase/Manufacture code from P to M, and check the Phantom field.

The system now thinks the 60014 is a manufactured item made from a 60014.1. If any item 60014 are in stock, the system will issue them; otherwise it will "blow through" the phantom and issue the 60014.1.

4   Run the Product Structure Cost Roll Up for the 01050 and review the Product Structure Cost Report. Note the indented structure for the 60014.1 and its cost 55.00 that has been rolled up to the 01050, not the 50.00 cost of the 60014.
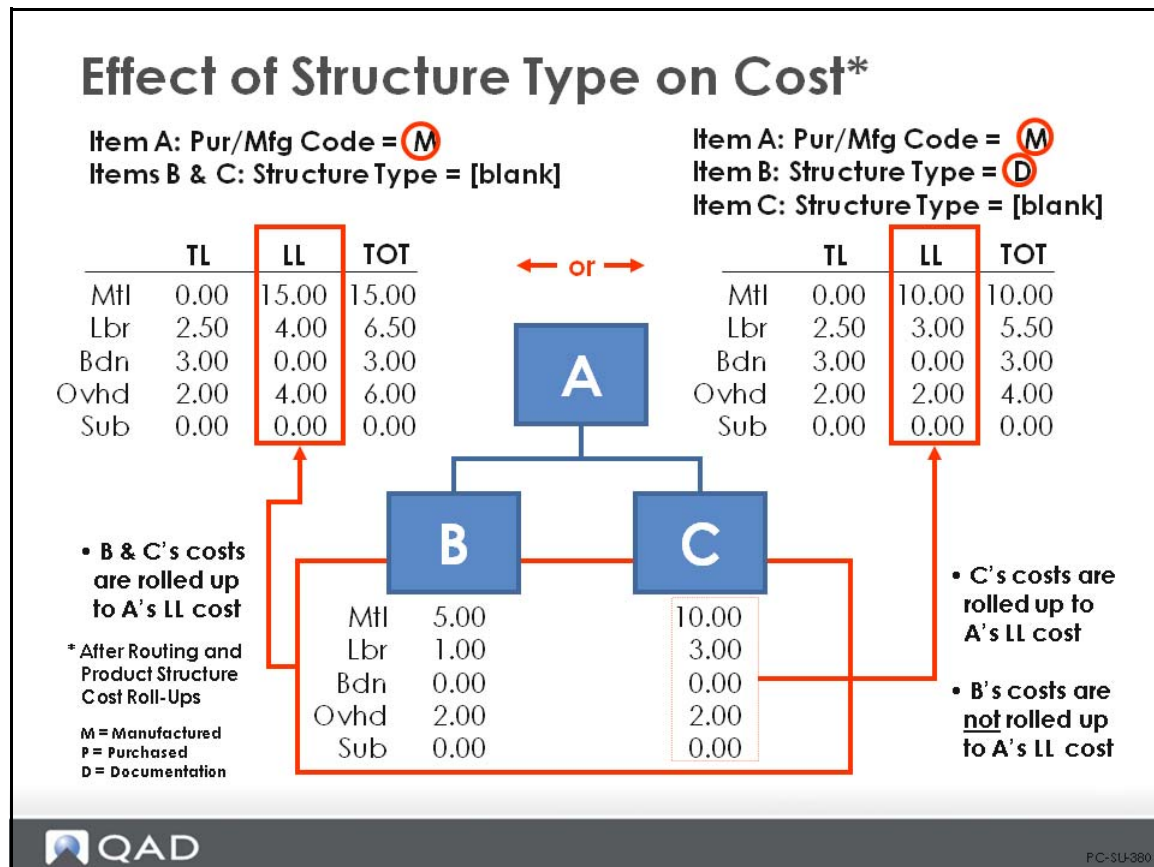

Another view of the new structure is given by the Product Structure by Item Report. Here you see the indented structure of the 60014 and that it is now a phantom. The fact that the system is using the cost of the phantom component, in this case the DVD while still consuming the CD, is something for management to be aware of and perhaps compensate for.

Effect of Structure Type on Costs

This example shows the difference in how a component in a product structure is affected by its structure code and type.

- When item A has a Pur/Mfg code of [M]anufactured and both components have blank structure type codes, all lower-level costs roll up correctly

- When component B has its structure type code changed to [D]ocumentation, only the lower-level costs for component C are rolled up to item A; lower-level costs for component B are not rolled up to item A. The same effect occurs if the structure code for a component is set to [P]lanning, or [O]ptional.

Exercise 10: Effect of Structure Type Code

1   Engineering has decided it needs to include instructions with the Ultrasound Upgrade Kit and has prepared an instruction sheet. Add this to the product structure.

Use Item Master Maintenance to create a new Item 01051, Upgrade Instructions. Assign it to Product Line 10 and make its status Active. Set its Purchase/Manufacture code to P. Advance to the Current Cost Screen and enter a material cost of 1.00.

A marketing decision is made to not include the cost of the instructions in the cost of the product.

2   Use Product Structure Maintenance for the 01050 and add the 01051 with a quantity of one, at operation 10, and its Type Code set to D, document. The Product Structure by Item Report now looks like this.

3   Run the Product Structure Cost Roll Up for item 01050 and review the Product Structure Cost Report. The 01051 is now included and shows as a cost of 1.00, but the cost has not been rolled up to the top level because of the structure type D. The 01050 lower level material cost is still 695.00.

The other structure type codes that are not included in a cost roll up are [P]lanning, [O]ption, [A]lternate and [J]oint. These are covered in detail in the course on product structures.

Reject Costing and Loss Costing

> # Reject and Loss Costing
>
> - Two distinct methods, three options
>   - Loss costing (method 1)
>   - Planning yield on order quantities (14.13.1) (option 2)
>   - Planning scrap on component issues (13.5) (option 3)
>   - Reject costing (method 2)
>   - Reporting scrap (16.11) (option 1)
> - Remember: Scrap and Yield are used for planning purposes
>
> QAD   PC-SU-390

In all of the calculations so far we have assumed that the production yield is 100%. But what happens if it is not? How do cost calculations account for yield losses? You have three options for accounting for losses

- Reporting scrap in Work Order Receipts (16.11) (also Work Order Receipt Backflush (16.12), Unplanned Receipts (3.7), Repetitive Backflush (18.22.13), Repetitive Scrap (18.18), Scrap Transaction (18.22.18), and Quality Order Results Entry (19.11))
- Planning yield on order quantities in Routing Maintenance (14.13.1)
- Planning scrap on component issues in Product Structure Maintenance (13.5)

The functionality can be categorized into two distinct methods, however: loss costing and reject costing. It is advisable to review the effects of yield versus scrap and select one method on a higher level basis (per product line, site, or domain).

It is important to keep in mind that yield and scrap are used for planning purposes (to ensure that you buy enough components to make enough product), which then requires special costing consideration.

Note Manually changing the Yield% field in the Item Planning screen for manufactured items will result in unexplained method variances if the planning yield does not equal the yield of the rolled-up routing and product structure.

Loss Costing

Loss Costing

- Item cost is inflated for yield (parent item)
- Expected yield (planned for)
- Cost of expected lost items included in inventory
- Variances against expected yield in material usage variance (when reported)

QAD

PC-SU-400

Loss costing means that the costs of lost items are factored into the good items received after production.

In QAD Enterprise Applications you can specify a yield% in Routing Maintenance (14.13.1) for each operation—the percentage of good items you expect to receive complete from the operation. If an operation has an 80% yield and you start with 100 items, you only expect to complete 80. However, from a cost perspective, you expect to issue enough materials and to incur enough labor, burden, and subcontract costs to make all 100. Using the yield percentage, you can factor these costs into the parent item.

Loss costing is reflected in either:

- Yield% in Routing Maintenance (14.13.1)

    Specified as the expected percentage of good assemblies produced

    Used when an assembly is scrapped during the manufacturing process

- Scrap% in Product Structure (13.5)

    Specified as a percent of a component

    Used if components are scrapped during the manufacturing process

In QAD Enterprise Applications, loss costing affects either:

- The yield percentages in the routing

    Whenever there are losses of parent items occurring in the production process, use yield in Routing Maintenance (14.13.1)

- Or, the scrap percentages in the product structure

    For a component, you can specify a percent in Product Structure Maintenance (13.5)

Implementing Loss Costing (Yield Percent)

Loss costing using yield percent is expressed as a percentage of usable parts produced in the manufacturing process and the yield is entered in Routing Maintenance (14.13.1).

- Routing Cost Roll-Up (14.13.13) multiplies individual operation yield percentages and posts the manufacturing yield to item data, Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), and Item-Site Planning Maintenance (1.4.17), and Work Order Maintenance (16.1)

- If MRP is to plan for increased requirements due to the yield being less than 100%, then the Yield% field in item planning, Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7) or Item-Site Planning Maintenance (1.4.17), must be set manually; or set the Roll-Up Item Yield field to Yes in Routing Cost Roll-Up (14.13.13)

- Manufacturing yield is calculated as:

    *Yield% for Op 10 * Yield% for Op 20 * Yield% for Op n ...*

Calculation of Costs for Yield

Lower-level and this-level material, labor, burden, and subcontract costs increase when yield is less than 100%, as shown in the example in the figure above.

Example   The example shown above and used on the next few pages is based on an order for 10 units of item 01020, which is manufactured in three operations. The yield at operation 10 is 90% and the yield at operation 20 is 80%, the yield at operation 30 is 100%.

In the report for item 01020 with 100% yield (the lower image) the lower level material cost is 374.7561897. The report for 72% yield shows lower level material cost as 520.4947079. 374.7561897/.72 = 520.4947079. The same logic applies to the other lower-level costs.

Yield Effect on Lower-Level Costs

Yield losses affect both lower-level and this-level costs.

- At the lower level, you lose components, increasing lower-level material, labor, and burden costs. Lower-level costs are calculated, for each component, as:

  (Material Cost / Yield%) + (Labor Cost / Yield%) + (Burden Cost / Yield%) + (Subcontract / Yield%) + (OH / Yield%)

- At this level, you lose parent items, increasing this-level labor, burden, and subcontract costs

Total costs are simply the sum of this level and lower level costs

In the example in the figure above, the lower-level costs for item 01020 are:

Material = 64.59754002/.72 + 34.21266617/.72 + 275.000007/.72 + 0.94597647/.72 = 520.4947079

Labor and Burden are calculated in the same manner.

*(Note: yield percentage does not affect **this-level** overhead or subcontract)*

This-level costs for item 01020 are:

Material = 0 / 72% = 0

Labor = 0.11 = Op 10 Labor of 0.06 + Op 20 Labor of 0.05

(Op 10 Labor 0.06 / 72%) + (Op 20 Labor 0.05 / 80%) = 0.0833333 + 0.0625 = 0.14583333

Burden = 0.28 = Op 10 Burden of 0.18 + Op 20 Burden of 0.1

(Op 10 Burden 0.18 / 72%) + (Op 20 Burden 0.1 / 80%) = 0.25 + 0.125 = 0.375

Unit total costs (this-level + lower-level costs) for item 02-0005 are:

Material = 0 + 0.7083375

Labor = 0.14583333 + 0.02777778 = 0.17361111

Burden = 0.375 + 0.05555556 = 0.43055556

Exercise 11: Effect of Product Structure Scrap

A problem has been encountered with the power cords. About 5% of the power cords are defective. The decision is made to add a scrap factor to the product structure to increase the planning quantities and the cost of the end item, until a solution is found.

1   Use Product Structure Maintenance for the 01050, for the component 60083 add a 5% scrap factor.

2 Run the Product Structure Cost Roll Up for the 01050 and review the Product Structure Cost Report.

```
Level  Component Item              Quantity Per Q UM T   Material       Labor        Burden      Overhead  Subcontract   Cost Total
------ -------------------------   ------------ - -- - ------------ ------------ ------------ ------------ ------------ ------------
Parent 01050
       Ultrasound Upgrade Kit      This Level            0.00        3.875        1.1625       0.00         0.00         5.0375
       09/22/10                    Lower Level           696.0526316 0.00         0.00         69.10526316  0.00         765.1578947
                                   Unit Total            696.0526316 3.875        1.1625       69.10526316  0.00         770.1953947

1      01051                1.0    EA D
       Upgrade Instructions        This Level            1.00         0.00         0.00         0.00         0.00         1.00
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                   Unit Total            1.00         0.00         0.00         0.00         0.00         1.00
                                   Ext Total             1.00         0.00         0.00         0.00         0.00         1.00

1      60014                1.0    EA
       Software CD                 This Level            50.00        0.00         0.00         5.00         0.00         55.00
       09/22/10                    Lower Level           55.00        0.00         0.00         5.00         0.00         60.00
                                   Unit Total            105.00       0.00         0.00         10.00        0.00         115.00
                                   Ext Total             105.00       0.00         0.00         10.00        0.00         115.00

.2     60014.1              1.0    EA
       Software DVD                This Level            55.00        0.00         0.00         5.00         0.00         60.00
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                   Unit Total            55.00        0.00         0.00         5.00         0.00         60.00
                                   Ext Total             55.00        0.00         0.00         5.00         0.00         60.00

1      60022                1.0    EA
       Battery Backup, Lithium     This Level            50.00        0.00         0.00         5.00         0.00         55.00
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                   Unit Total            50.00        0.00         0.00         5.00         0.00         55.00
                                   Ext Total             50.00        0.00         0.00         5.00         0.00         55.00

1      60052                1.0    EA
       High Performance CPU        This Level            500.00       0.00         0.00         50.00        0.00         550.00
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                   Unit Total            500.00       0.00         0.00         50.00        0.00         550.00
                                   Ext Total             500.00       0.00         0.00         50.00        0.00         550.00

1      60083                1.0    EA
       Power Cord – Universal      This Level            20.00        0.00         0.00         2.00         0.00         22.00
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
       Scrap:   5.00%              Unit Total            20.00        0.00         0.00         2.00         0.00         22.00
                                   Ext Total             21.05263158  0.00         0.00         2.10526316   0.00         23.15789474

1      60089                1.0    EA
       Power Converter – Smart     This Level            50.00        0.00         0.00         5.00         0.00         55.00
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                   Unit Total            50.00        0.00         0.00         5.00         0.00         55.00
                                   Ext Total             50.00        0.00         0.00         5.00         0.00         55.00

1      90070                2.0    EA
       Assortment Box              This Level            5.00         0.00         0.00         0.50         0.00         5.50
       09/22/10                    Lower Level           0.00         0.00         0.00         0.00         0.00         0.00
                                   Unit Total            5.00         0.00         0.00         0.50         0.00         5.50
                                   Ext Total             10.00        0.00         0.00         1.00         0.00         11.00
```
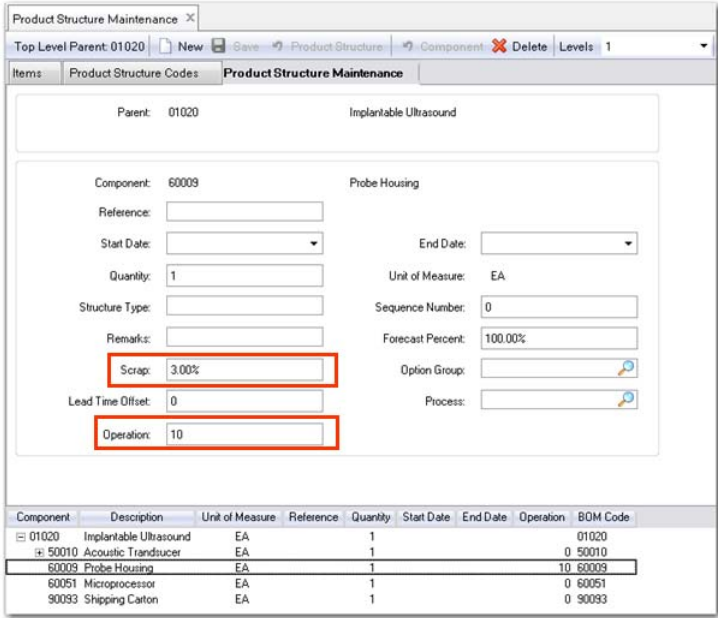
Note the annotation of Scrap 5%. The item 60083 has had its cost of 20.00 inflated by 5% (20/0.95 = 21.05263158). There is a corresponding increase in the Overhead cost. These costs are rolled up to the lower level material and overhead accounts of the end item 01050.

3 3. Let's assume the problem has been corrected. Use Product Structure Maintenance for the 01050, and for the component 60083 remove the 5% scrap factor.

Run the Product Structure Cost Roll Up for the 01050 and review the Product Structure Cost Report to ensure that the lower level material cost of the 01050 is again 695.00 and the overhead is 69.00.

Loss Costing: Scrap Percent

Loss costing using scrap percent is the inverse of loss costing using yield percent and is used to indicate the expected additional quantities of this component required to produce the parent. The scrap percent is entered in Product Structure Maintenance (13.5).

Quantity per and scrap percentage are used by the Product Structure Cost Roll-Up (13.12.13) for calculating the cost of the parent item

If the Operation field is left blank, then the system assumes that all components are issued at the first operation; therefore cumulative yield losses apply to all components. This is normally the case on all BOMs that will be used with machining or processing work orders.

If an operation code is entered in the Operation field, then, for cost calculations, the system considers the operation at which the components are normally issued. Cumulative yield loss applies only to those components that have been issued up through that operation. This is appropriate for assembly type BOMs where components are used at various stages in the routing.

The same component can be issued at several operations each with a different scrap value.

Lower-Level and Total Costs Calculations

Example The lower-level and total costs shown in the figure above are based on no scrap or yield for any item.

The This Level and Extended Total for the Probe Housing 60009, is 34.21266617. The total Lower Level material costs for the 01020 Ultrasound are 374.7561897.

Lower-Level & Total Costs 2 of 2

In this example 3% scrap has been added to the component 60009 Probe Housing.

The cost of the Probe Housing is still 34.21266617, but the Extended Total is now 35.27078987 to reflect the 3% scrap. (34.21266617/.97) = 35.27078987. This increased cost is rolled up to the lower level material cost of the top level 01020 Ultrasound.

Reject Costing

Reject Costing

- Item cost is not inflated
  - No changes to route or product structure
- Planned yield (100%)
- Cost of scrap tracked in GL Scrap account
- Scrap is Reported at
  - Shop Floor Control, WO Receipt, Unplanned Issue, or Quality Management
- Issue to decide…
  - Report as COGS or Expense?
  - Do not use reject and loss costing at the same time

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PC-SU-490

In reject costing, you do not specify any yield percentages in the operations. Instead, the costs of scrap are tracked in a special Scrap account. Unlike when using loss costing, in reject costing you are reporting the actual scrap occurring in the production process.

Reject Costing

In QAD Enterprise Applications, reject costing can affect:

- Work Order Receipt (16.11) (shown in figure above) or Work Order Receipt Backflush (16.12)

- Shop Floor Control (17.1)

  When recording rejects in SFC, only those units that are recorded as rejects in both SFC and in one of the work order receipt transactions have corresponding transactions reflecting that loss for the GL. (An entry is created to debit Scrap and Credit WIP.) Rejects recorded in SFC alone are recorded for reporting purposes only and have no consequence for the GL.

- Repetitive (Repetitive Scrap (18.18)) and Advanced Repetitive (Backflush Transaction (18.22.13), and Scrap Transaction (18.22.18))

- Unplanned Issues (3.7)

  Another way of sending something to scrap is to use unplanned issue to scrap, which means that you must change the default accounts to the Scrap account

- Quality Management (19.11)

  Quality order items that fail inspection are scrapped. The Scrap account for the product line is debited and the Inventory account defined in Inventory Account Maintenance for the product line at the inspection site and location is credited

Exercise 12: Effect of Work Order Reject Costing

This is a rather long involved exercise to show the effect of the scrap transaction. Review the screen shots for the exercise.

Scrap and yield do not need to be included in the structure and or route. You can write off the cost of rejects to the scrap account at work order close.

Review Product Line Maintenance (12.1); note the scrap account 6000-MECH.

In this exercise you will use Work Order Maintenance (16.1) to create and issue a work order. You will print the picklist, issue the components, and tract their cost into the WIP account.

You will complete and receive the work order and report scrap. You will not report labor but will see that the system books labor (and burden) at standard when it is not reported.

1   Use Simulated Picklist Item Check (13.8.17) to inquire on available inventory of the components needed to make the Ultrasound Upgrade Kit. Set the order quantity to 10 and leave operation at the default 0 to see components needed at all operations.
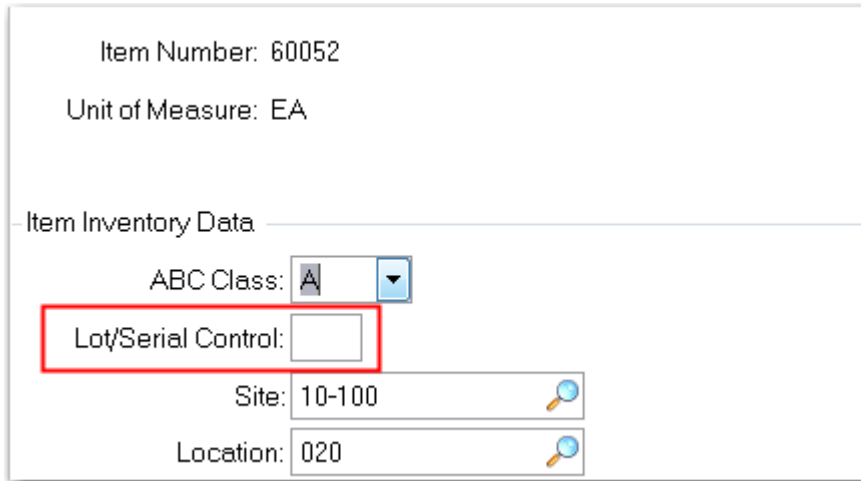
```
                    Simulated Picklist Item Check              09/23/10
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Parent Item: 01050            Ultrasound Upgrade Kit       As Of: 09/23/10
       Site: 10-100   Quantity: 10.0       EA Net OH: Yes  Use up PH: Yes
        Op: 0                                          Output: PAGE

Component
Description          Ph              Reqd UM  Available        Short     Op
------------------   --------  --------------- -- ---------- --------------- ------
60014                Ph              10.0 EA       50.0           0.0       10
Software CD
60014.1                              0.0 EA        0.0           0.0       10
Software DVD
60022                               10.0 EA        0.0          10.0       20
Battery Backup, Li
60052                               10.0 EA        1.0           9.0       10
High Performance C
60083                               10.0 EA       63.0           0.0       20
Power Cord - Unive
60089                               10.0 EA       63.0           0.0       20
Power Converter -
90070                               10.0 EA        0.0          10.0       10
Assortment Box
90070                               10.0 EA        0.0          10.0       20
Assortment Box
90093                               10.0 EA      170.0           0.0       30
Shipping Carton
```

This view shows the CD's in inventory which will be issued because the item is a phantom. You are short 10 of the batteries, 9 of the CPU's and 20 of the Assortment box.

The high performance CPU is a serial controlled item, to simplify the exercise Use Item Inventory Data Maintenance (1.4.5) to delete the S from the Lot/Serial Control field.

Note the default site and location

2   Use the Receipts Unplanned (3.9) transaction to receive enough inventory to complete the exercise. Receive 20 of the 60022 battery, 19 of the 60052 CPU and 40 of the 90070 box. You do not yet need to receive any of the new DVD's as there are more than enough of the CD in stock. All the items should default to site 10-100 and location 020.

You could run the Simulated Picklist again to be sure the transactions worked.

3   Use Work Order Maintenance (16.1) to create a work order for 10 each of the 01050 at Site 10-100. Leave the Status at F, Firm Planned.

```
┌─ Work Order:1001 ──────────────────────────────────────────────────────────┐
│                                                                              │
│                                                                              │
│     Work Order: │ 1001 │                    🔍    ID: 2287246                │
│                                                                              │
│     Item Number:  01050                          Ultrasound Upgrade Kit      │
│            Type:                                                             │
│          ┌─────────────────┐                                                 │
│          │ Site:  10-100   │                                                 │
│          └─────────────────┘                                                 │
│                                                                              │
│                                                                              │
│     Quantity Ordered:              10.0          Order Date: 9/23/2010       │
│     Quantity Completed:             0.0        Release Date: 9/23/2010       │
│           Qty Rejected:             0.0            Due Date: 9/24/2010       │
│                                                                              │
│   ┌─────────────────────────┐                                               │
│   │ Work Order Status:  F   │                               Site: 10-100    │
│   └─────────────────────────┘                                               │
│            Sales/Job:                          Routing Code:                 │
│             Supplier:                       BOM/Formula Code:                 │
│         Yield Percent:    100.00%                                            │
│                                                                              │
└──────────────────────────────────────────────────────────────────────────────┘
```

4 Use Work Order Release Print (16.6) to release the work order (change its status to R) and to print a Picklist. Review the Picklist and scroll down to see the Routing.

Use Work Order Component Issue (16.10) to issue the components as defined on the Picklist.

Use Transaction Detail Inquiry (3.21.1) to review the inventory effects of the material issue. As you enter the transaction detail screen, the Transaction field will default to the last transaction the system processed. This will be the last material issue. You can scroll (or use the lookup to see recent transactions. Find one of the ISS-WO transactions and go to the next screen. (Note: Though we have deleted the Serial control for the CPU you can see the system issue one with a serial number.)

Here you will see the complete details of the ISS-WO (issue work order) transaction. The key points for this exercise are the Debit to WIP, account 1550 and the Credit to Inventory account 1500. This transaction was processed for all the components issued to the work order. In the example screen you see the ISS-WO for the 60089 Power Converter. You see the value of inventory reduced by 550.00 and the value of WIP for order 1002 increased by that amount. Remember all inventory transactions are booked at GL Standard Cost.


```
                    Transactions Detail Inquiry                    09/23/10

    Transaction: 28072     Display E-Signature Details: Yes  Output: PAGE
============================= E-Signature Details =============================
Category: InvTran
This data is currently unsigned
======================== End of e-signature details ========================
        Tran Nbr: 28072                     Order: 1002              2287254
      Trans Type: ISS-WO                  Revision: 0
            Date: 09/23/10            Item Number: 60089
            Time: 17:16              Description: Power Converter - Smart
  Effective Date: 09/23/10       Unit of Measure: EA
         Remarks:                         Address:
         User ID: qmi                        Name:
         Program: wowois.p                  SO/Job:
        Currency: USD                    Ship Type:
      Qty Change: -10.0                      Price: 55.00
  Shipper Number:                             IMC:
       Ship Date:

                              Inventory Data
            Site: 10-100              Begin Balance: 53.0
        Location: 020              Quantity Change: -10.0
       Lot/Serial:                      Qty Short: 0.0
      Inv Status: Y-Y-Y            Begin Loc Bal: 53.0
    Supplier Lot:                  Loc Qty Change: -10.0
     Grade/Assay:                     Expire Date:
       Reference:                           Batch:

                                Cost Data
            Material: 50.00                 Overhead: 5.00
               Labor: 0.00               Subcontract: 0.00
              Burden: 0.00                Cost Total: 55.00

                              ISS-WO
Debit Acct: 1550      Mech
Cr Account: 1500      Mech
    Amount: 550.00                    Reference ID: IC100923000053
GL Reference: 2010/WOISS000000027
```

The total amount of increase in WIP is the sum of the material cost of the 01050, at GL Standard.

5   Use Work Order Receipt (16.11) to receive 9 units into location 020 and report 1 unit scrap. Be sure to check the Close box.

Use Transaction Detail Inquiry (3.21.1) to review the inventory effects of the Work Order Receipt. The last transaction is the scraped unit, the previous transaction is the receipt. The RCT-WO shows the WIP account 1550 being credited 6,921.34 with is the cost of 9 of the 01050 at a GL cost of 769.0375. Inventory has been debited with the same value.

```
                            Cost Data
            Material: 695.00              Overhead: 69.00
              Labor: 3.875            Subcontract: 0.00
             Burden: 1.1625            Cost Total: 769.0375

                             RCT-WO
Debit Acct: 1500      Mech
Cr Account: 1550      Mech
     Amount: 6,921.34                 Reference ID: IC100923000057
GL Reference: 2010/WORCT000000008
```

On the scrap transaction RJCT-WO you see the standard cost of one unit being debited to the Scrap account 6000 and the corresponding credit to WIP. This writes off the cost of the scrap to an expense account rather than costing it into the product cost.

```
                            Cost Data
            Material: 695.00              Overhead: 69.00
              Labor: 3.875            Subcontract: 0.00
             Burden: 1.1625            Cost Total: 769.0375

                            RJCT-WO
Debit Acct: 6000      Mech
Cr Account: 1550      Mech
     Amount: 769.04                   Reference ID: IC100923000058
GL Reference: 2010/SYS-DB000000225
```

Transactions Detail Inquiry

- At work order issue and during manufacturing, WIP is debited the full standard quantity × standard cost (for each lower-level component and this-level item)

  *Total GL Cost * Standard Qty*

  *(769.04 * 10) = 7,690.40*

- Upon completion of production, Inventory is debited the actual quantity of good units (standard quantity - scrapped quantity) × standard cost (see RCT-WO in figure above)

  *(Standard Qty - Scrapped Qty) * Standard Cost*

  *(100- 1) * 769.04 = 6,921.34*

- Scrapping is booked by crediting for the number of scrapped units ∗ (standard cost - overhead), and debiting the Scrap account for the same amount. Number of Scrapped Units ∗ (Standard Cost - Overhead)

  10x (769.04 = 769.04

- A disadvantage of using scrap with work orders is that scrap incurred at all stages of manufacture is valued at full GL cost

- In the repetitive modules, scrap is valued at the cumulative cost up to the operation where the scrap is incurred

Summary

As you can see, loss costing and reject costing lead to different item costs. In the case of loss costing, the item costs will be higher. This also has an influence on margin calculations and on the calculations of Cost of Goods Sold. Please note this when making the decision between scrap and yield costing.

It is important that you notice that loss and reject costing should not be used at the same time. You will have to decide which of the two methods fits your business environment best.

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Formula Maintenance

Formula Maintenance (15.5) operates in much the same way as Product Structure Maintenance for cost purposes. This screen allows data to be entered as a Qty Per as above and also allows entry as Qty Per Batch and% Batch. A structure entered as a formula cannot be changed in Product Structure Maintenance, but the reverse is permitted.

Batch Quantity is set for the item in a site and used in Formula and Process definition, but QAD Enterprise Applications still calculates costs as cost per unit, not cost per batch.

Note If Batch Quantity does not equal Order Quantity (see Item Planning Maintenance (1.4.7) or Item Site Planning Maintenance (1.4.17)) then a method variance will result.

Summary

As a review, a summary of key components of item cost are given on the following pages, along with routing cost calculations.

Components of Item Cost: Material

Components of Item Cost: Material

Dependent On	Defined In
Material/purchase price	Item Master Maintenance (1.4.1), (1.4.9), (1.4.18)
Quantity Per	Product Structure Maintenance (13.5)
Scrap %	Product Structure Maintenance (13.5)
Phantom	Item Master Maintenance (1.4.1), (1.4.7), (1.4.17)
Pur/Mfg	Item Master Maintenance (1.4.1), (1.4.7), (1.4.17)
Structure Type	Product Structure Maintenance (13.5)
Yield %	Routing Maintenance (14.13.1), or (14.13.2) for Rate Based
Issue Policy	Item Master Maintenance (1.4.1), (1.4.7), (1.4.17)

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PC-SU-540

Components of Item Cost: Labor

Components of Item Cost: Labor

Dependent On	Defined In
Work Center Labor Rates	Work Center Maintenance (14.5)
Work Center Setup Rates	Work Center Maintenance (14.5)
Run Time per Unit	Routing Maintenance (14.13.1)
Setup Time per Lot/Batch	Routing Maintenance (14.13.1)
Order Quantity	Item Master Maintenance (1.4.1), (1.4.7), or (1.4.17)
Subcontract Cost	Routing Maintenance (14.13.1) or (14.13.2) for Rate Based

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Components of Item Cost: Burden

Components of Item Cost: Burden

Dependent On	Defined In
Work Center Labor Burden Rates	Work Center Maintenance (14.5)
Work Center Labor Burden Percent	Work Center Maintenance (14.5)
Work Center Machine Burden Rate	
Machines/Operation	Work Center Maintenance (14.5)
(plus all of the items listed under Labor, except Subcontract)	Work Center Maintenance (14.5), (14.13.1), or (14.13.2)

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PC-SU-560

Routing Cost Calculations: Review

Routing Cost Calculations: Review

- Labor Cost Per Operation
- Setup Cost = (Setup Hrs / Order Qty) x WC Setup Rate
  Run Cost = Run Hrs x WC Labor Rate
  Labor Cost = Setup Cost + Run Cost
- Labor Burden Cost Per Operation
- Setup Burden
  Burden = (Setup Hrs / Order Qty) x WC Lbr Bdn Rate
  Burden % = (Setup Hrs / Order Qty) x WC Setup Rate x WC Lbr Bdn%
- Run Cost Burden
  Burden = Run Hrs x WC Lbr Bdn Rate
  Burden % = Run Hrs x WC Lbr Rate x WC Lbr Bdn%
- Machine Burden Cost Per Operation
- Setup = (Setup Hrs / Order Qty) x (Mach / Op) x WC Mach Bdn Rate
  Run = Run Hrs x WC Mach Bdn Rate

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PC-SU-580

Product Costing Processes

Process

In this section, we will discuss the product costing process.

Product Costing: Process
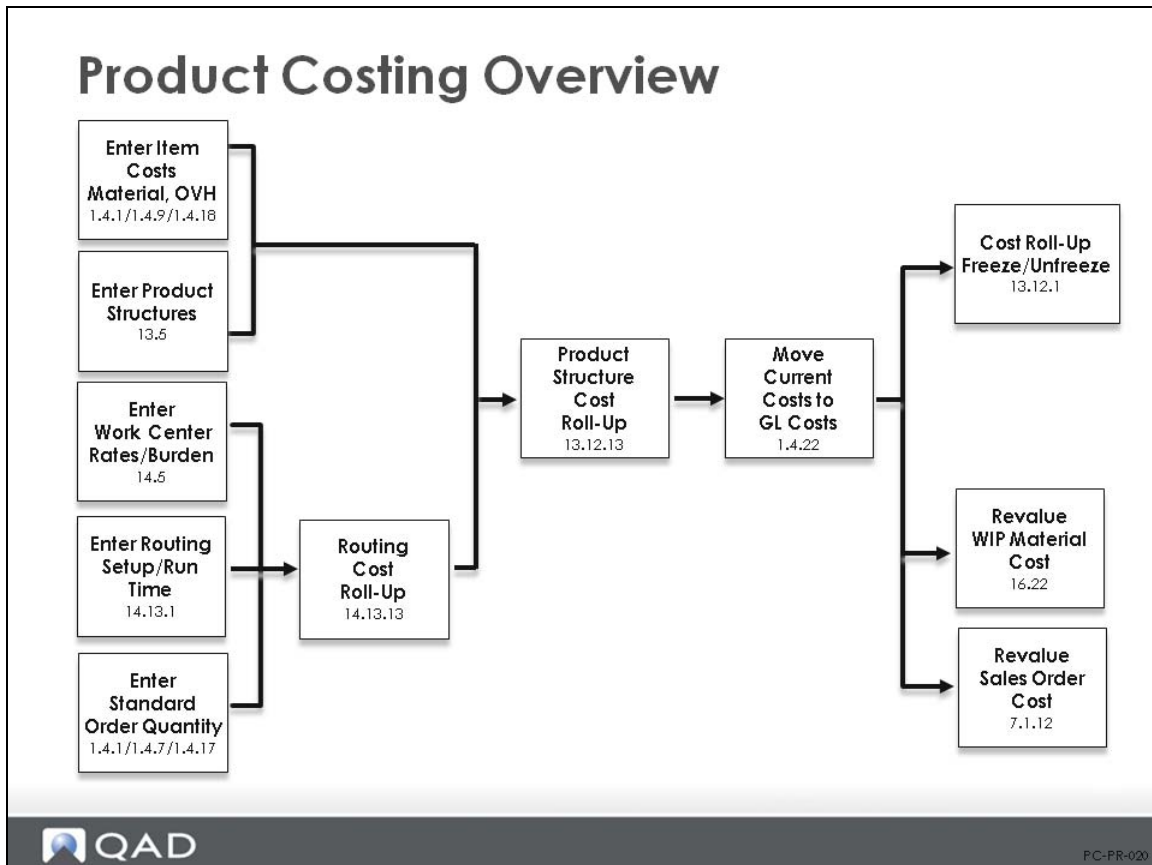
The focus of this chapter is on the product costing process, which is divided into two parts: setup, described in the previous chapter, and processing, discussed here.

An overview of the whole product costing process is shown in the figure above.

Product Costing Process: Summary
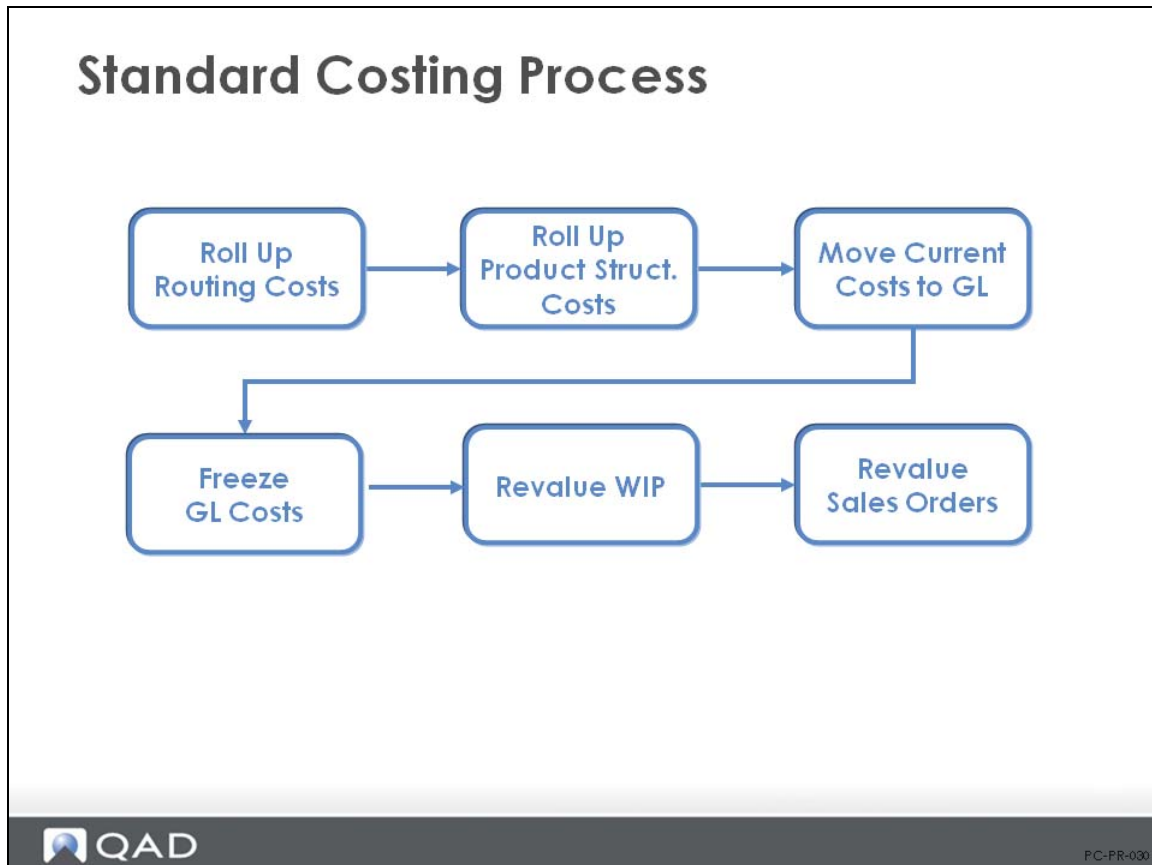
The costing process is essentially a two-step process for items other than purchased parts.

- The first step is to run the Routing Cost Roll-Up (14.13.13), which totals the labor/machine hours and cost, subcontract cost, and burden cost; computes the cumulative operation yield for a routing or routings; and sums the this-level labor and burden cost data for the specified cost set.

- The second step is to run the Product Structure Cost Roll-Up (13.12.13), which obtains purchased material and this-level labor and burden costs for the item, and performs the level-by-level computation of costs for the five cost set categories - material, labor, burden, overhead, and subcontract. The Product Structure Cost Roll-Up updates cumulative lower-level costs for all cost categories at each assembly level.

Usually, roll-ups are carried out in the Current or Simulation cost set. This permits validation prior to committing them as new GL standards.

- Using Current Cost Set

    Following the routing and product structure cost roll-ups, you then move the current cost set to GL using Current Cost Set Move to GL Set (1.4.22), and then optionally freeze the newly established cost using Cost Roll-Up Freeze/Unfreeze (13.12.1).

- Using Simulation Cost Set

    For more information, see *QAD Cost Management Training Guide.*

Cost Calculations
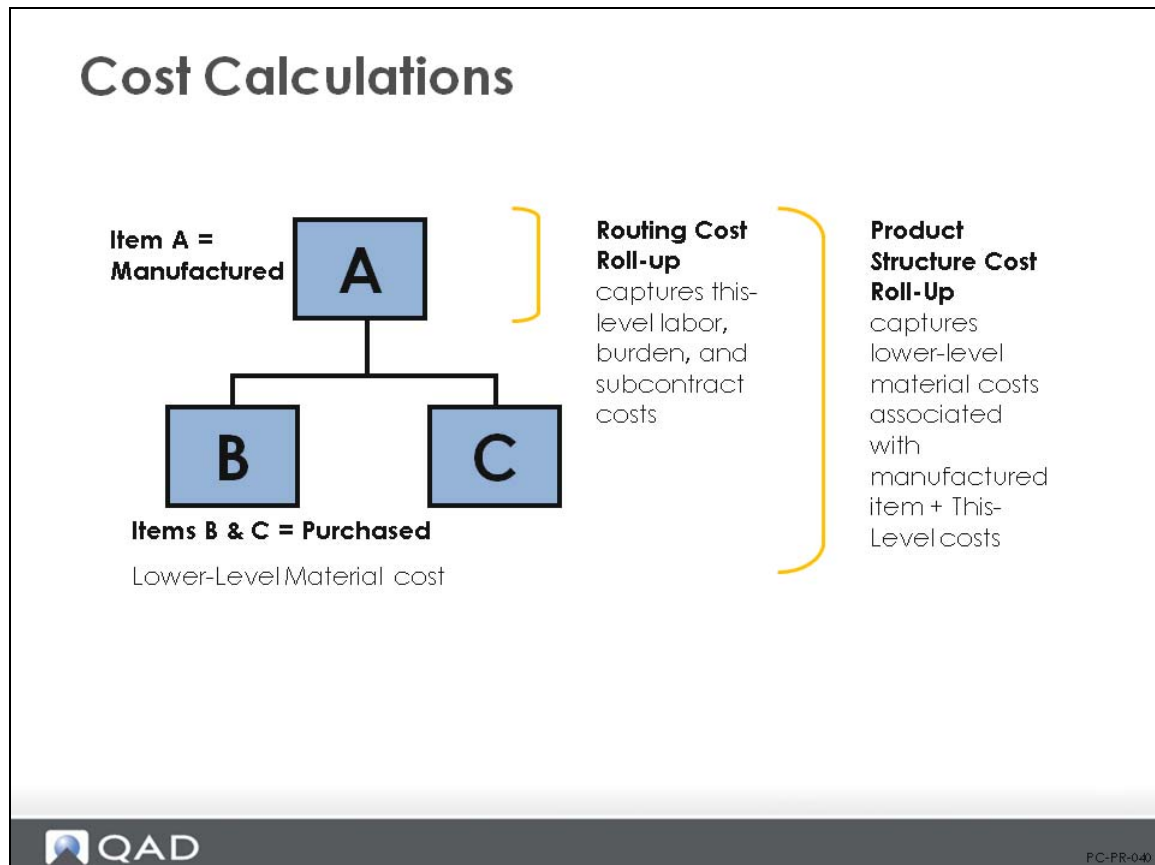
Costs are calculated in different ways depending on the cost level and element being defined.

- For purchased items, the standard cost is entered manually as material, this level. Overhead is an independent cost that is also entered manually or calculated by Item Overhead Cost Update (1.4.21). Distribution items are treated in the same way as purchased items and require manual input of this-level costs.

- Manufactured items get their this-level costs from the Routing Cost Roll-Up process, which calculates costs for labor, burden, and subcontract. Product Structure Cost Roll-Up adds lower-level costs to an item. Total cost is the sum of this-level and lower-level costs.

Roll Up Routing Costs
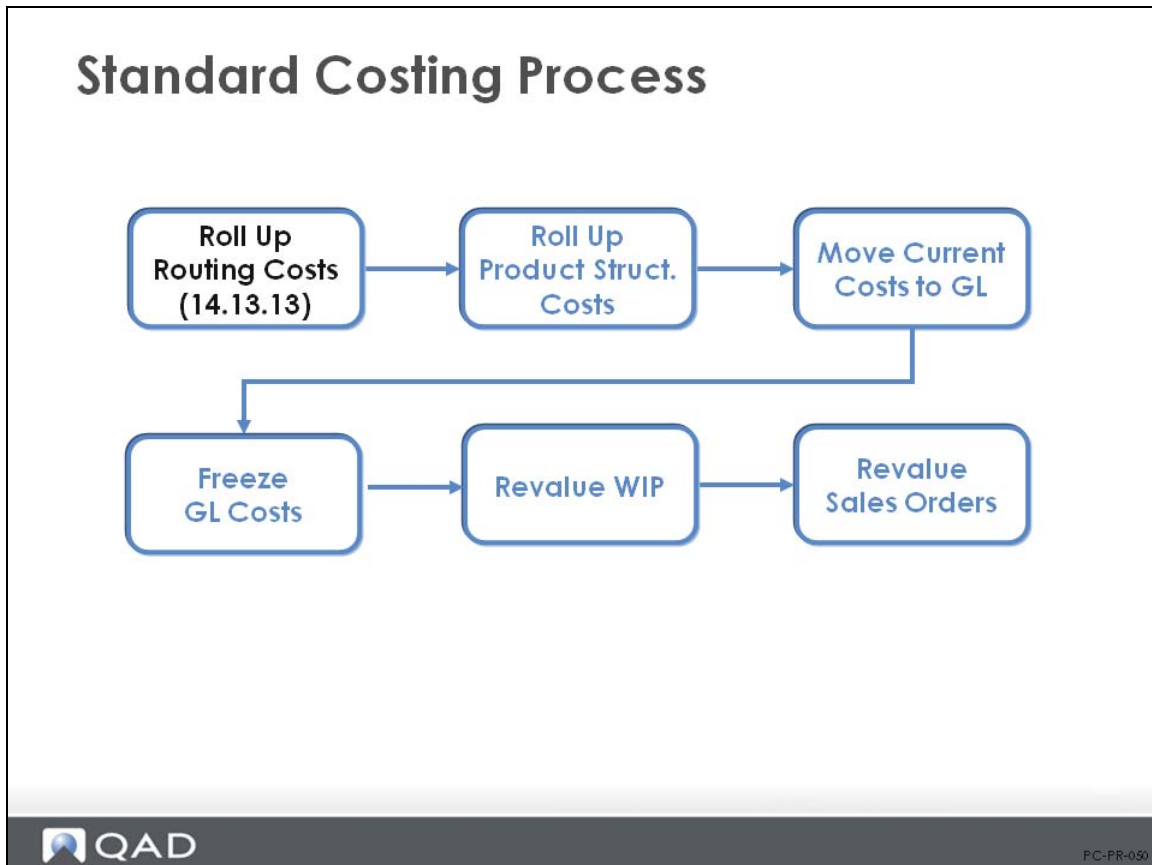
Routing Cost Roll-Up (14.13.13) is used to calculate the costs for items based on their routing (process) operations. The roll-up uses data defined in:

- Item Master Maintenance (1.4.1)
- Routing Maintenance (14.13.1)
- Work Center Maintenance (14.5)

Routing Cost Roll-Up Calculations

Routing cost calculations are used to calculate the value of this-level labor, burden, and subcontract costs per item

- The work center data is used to obtain hourly rates for setup and run labor. The work center also provides the burden rates as cost per hour for labor and machine burden, as well as a labor burden percent.

- The routing records provide the setup and run times (standard), as well as the machines per operation and operation yield percent.

- The item (site) planning record provides the order quantity value, which is used to amortize setup cost over a standard or normal order size to obtain a realistic cost per unit value.

When you first set up routings, Routing Cost Roll-Up enables you to verify the item cost figures and the routing itself. The regular use of the roll-up is used to determine the current cost of an item.

Roll Up Current Cost Set First

You can roll up either current or GL costs. The default is to roll up current costs.

You can roll up GL costs when they change, but it is safer to roll up current costs and then move them using Current Cost Set Move to GL (1.4.22). This function is discussed on Current Cost Set Move to GL Set.

Routing Cost Calculations: Review

Routing Cost Calculations: Review

- Labor Cost Per Operation
- Setup Cost = (Setup Hrs / Order Qty) x WC Setup Rate
  Run Cost = Run Hrs x WC Labor Rate
  Labor Cost = Setup Cost + Run Cost

- Labor Burden Cost Per Operation
- Setup Burden
  Burden = (Setup Hrs / Order Qty) x WC Lbr Bdn Rate
  Burden % = (Setup Hrs / Order Qty) x WC Setup Rate x WC Lbr Bdn%
- Run Cost Burden
  Burden = Run Hrs x WC Lbr Bdn Rate
  Burden % = Run Hrs x WC Lbr Rate x WC Lbr Bdn%

- Machine Burden Cost Per Operation
- Setup = (Setup Hrs / Order Qty) x (Mach / Op) x WC Mach Bdn Rate
  Run = Run Hrs x WC Mach Bdn Rate

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PC-PR-070

Routing Cost Roll-Up

Key fields in Routing Cost Roll-Up (14.13.13) are:

As of Date. Roll-up calculations only consider operations effective on the specified date. The default is the system date.

Roll-Up Labor Time, Setup Time, and Lead Time. Often, these fields should be set to No so that the manufacturing lead time entered in the Item Planning data is not overridden. This should be discussed with the Planners to determine how these fields should be set. The default setting is Yes.

Include Yield in Cost. Yield is calculated by operation and the compounded yield for all operations can optionally be used to update the item master yield for planning purposes (set Roll-Up Item Yield field to Yes). The order quantity planned will be increased to cover the expected losses, which will require more components and production time. This yield can be calculated into the costs (if set to Yes) or be excluded from the cost process (if set to No).

Note QAD Enterprise Applications does not calculate a yield variance. It will calculate material and labor usage variances and a method variance, which will include the yield variances.

Roll-up Labor/Burden/Subcontract Cost. Routing Cost Roll-Up can calculate this-level costs for individual elements or for all elements: labor, burden, and subcontract. Normally set these fields to Yes.

Update Items Without Routings. This determines whether cost calculations include only those items with routings, or all items. This field allows the user to clear out costs associated with obsolete routings. For example, if a company decides to stop making an item and start to acquire it from another source, simply deleting the routing does not clear out all of the manufacturing costs associated with this item. To reset those costs to zero, run the routing cost roll-up with Update Items Without Routings set to Yes. If this item is a component, then you also need to run the Product Structure Cost Roll-Up.

Roll Up Product Structure Costs
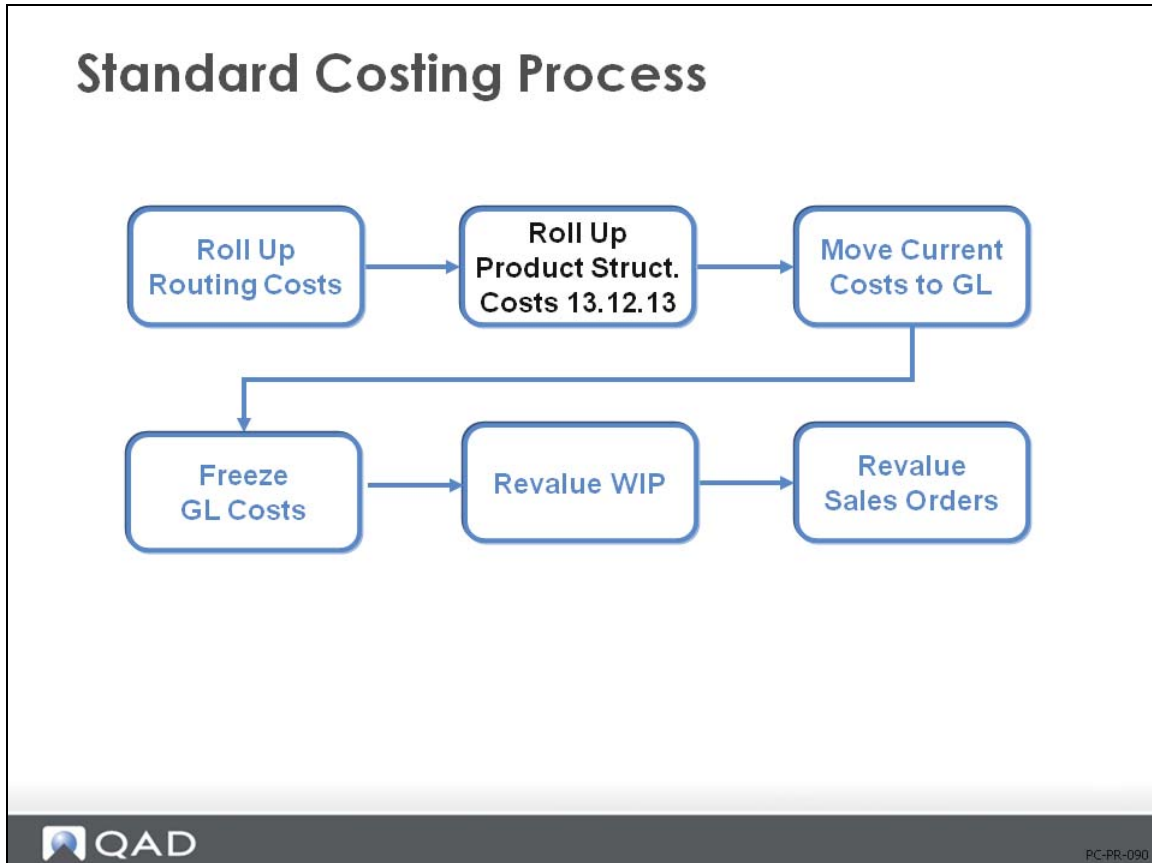
Product Structure Cost Roll-Up (13.12.13) is used to update the costs of parent items based on the costs of their lower-level components.

Product Structure Cost Roll Up (13.12.13)

Set Cost Update Field for All/Changed Only

- If All, this field is set to the run date for all parts

- If Changed Only, this field is set to the run date for items where costs have actually changed. This option gives better audit trail of dates when costs changed.

Include Yield %. Determines whether yield percentages from Routing Maintenance (14.13.1) are used to calculate component item costs. If set to Yes, component costs are adjusted to account for any yield percentage. This adjustment can be upwards (yield < 100%) or downwards (yield > 100%).

Note If Scrap in Product Structure Maintenance (13.1) is set to a value other than 0.00%, the system adds those costs to the parent material cost lower level. Yield and scrap are separate values. If both are used, both will be calculated into the parent costs.

Item/Product 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 relationship to display. The default is the system date.

Low Level Costs (Material, Labor, Burden, Overhead, Subcontract). Set these fields to Yes to include lower-level costs in the cost roll-up.

Product Structure Cost Report

Product Structure Cost Report (13.12.4) shows costs for an item and its components by structure level.

Move Current Costs to the GL
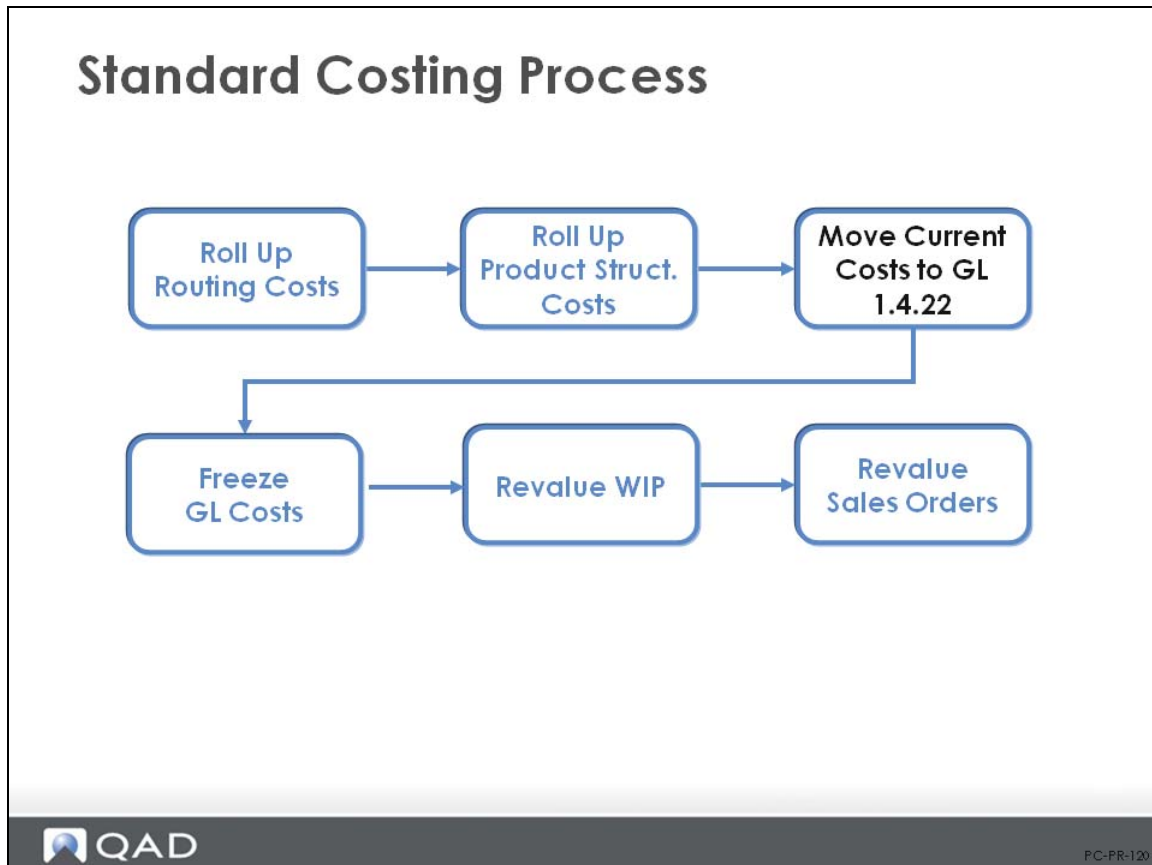
QAD Enterprise Applications maintains at least two cost sets for each item-site pair: current, which reflects today's cost for an item, and GL, which is used for all general ledger transactions. At the beginning of the year, many companies set current and GL costs to be equal. You can do this with Current Cost Set Move to GL Set (1.4.22).

When costs change, update and verify the change in the current costs first, then use Current Cost Set Move to GL Set to reflect the change in the GL cost set. Current Cost Set Move to GL Set is most commonly used only at regular, widely spaced intervals; usually annually.

Sales order and work-in-process are not revalued automatically. To revalue them, you must use Sales Order Cost Revaluation (7.1.12) or WIP Material Cost Revaluation (16.22). This should be done whenever standard costs change.

Moving current costs can have significant effects on the general ledger. All changes to GL costs create a GL cost adjustment, updating the value of inventory.

Note This function should be password controlled.

Current Cost Set Move to GL Set (1.4.22)

Item Number / Prod Line / Item Type / Group / ABC Class / Pur/Mfg / Buyer/Planner. The selection criteria allows you to move only specific types of items if required; for example, certain product lines, item types (for example, only finished goods), or ABC classes.

Pct Change Allowed. This field restricts the cost movement to items whose GL costs would change only within the indicated range. To accept the movement of all costs regardless of the difference from the previous GL costs, enter a question mark (?) in this field and its corresponding To field. You can look at the potential consequences before actually moving the current costs to GL costs. To do this, set Pct Change Allowed to 0% (and its corresponding To field). The proposed changes will be displayed on the output device you have chosen (terminal, window, or printer), but not made to the GL costs.

   Pct Change Allowed = ? for no restrictions

   Pct Change Allowed = 0 to review

Note   Note that where the GL cost is zero, the current cost is copied regardless of any percentage change restrictions

Copy Material / Labor/Burden / Overhead / Subcontract Cost. Normally, set all fields to Yes. Each cost component is copied from the current cost set into the GL cost set, provided that the difference between the two total costs does not exceed the Percentage Change Allowed.

Output. Always print the report. If GL costs are changed by mistake, you must manually reenter the old cost in Item-Site Cost Maintenance (1.4.18).

Exercise 13: Current Cost Set Move to GL Set

Now that we have the costs for the new item you need to copy them to the GL Cost Set. Recall that all transactions are costed at GL Standard. Since you have been working only in the Current Cost Set, there is no GL cost for the 01050.

However the components do have Current and GL costs in the database and you want to update all of them to your new values.

1 Use Item Site Cost Inquiry (1.4.10) for item 01050 at site 10-100 to verify the current costs and see that there are no GL costs.

```
                    Item-Site Cost Inquiry                     09/2

  Item Number: 01050            Ultrasound Upgrade Kit
    Inv Site: 10-100      UM: EA                    Output: PAGE
                            Item Price Data
        Price: 3,000.00             Tax: Yes   Tax Class:
 Fiscal Class:
                               Totals
Totals:              0.00          0.00          0.00     09/20/10

        GL Cost Data (GL Cost Source Site: 10-100 / Set: Standard)
Element         This Level      Lower Level          Total Pri Category A/O
----------    --------------  --------------  --------------- --- -------- ---
Material           0.00            0.00            0.00 Yes Material  No
Labor              0.00            0.00            0.00 Yes Labor     No
Burden             0.00            0.00            0.00 Yes Burden    No
Overhead           0.00            0.00            0.00 Yes Overhead  No
Subcontr           0.00            0.00            0.00 Yes Subcontr  No
                               Totals
Totals:            5.0375        764.00         769.0375     09/23/10

        Current Cost Data (GL Cost Source Site: 10-100 / Set: Current)
Element         This Level      Lower Level          Total Pri Category A/O
----------    --------------  --------------  --------------- --- -------- ---
Material           0.00          695.00          695.00 Yes Material  No
Labor              3.875           0.00            3.875 Yes Labor    No
Burden             1.1625          0.00            1.1625 Yes Burden   No
Overhead           0.00           69.00           69.00 Yes Overhead  No
Subcontr           0.00            0.00            0.00 Yes Subcontr  No
```

2   Use Current Cost Set Move to GL Set (1.4.22) to move the current costs for all items to the GL Cost Set. Specify Site 10-100 and leave the Item number from / to fields blank, this will move all current costs. Be sure to put a ? in the percent change allowed from / to fields.

```
                        Item-Site Cost Inquiry                        09/23

QAD

  Item Number: 01050              Ultrasound Upgrade Kit
     Inv Site: 10-100     UM: EA                          Output: PAGE
                             Item Price Data
          Price: 3,000.00            Tax: Yes    Tax Class:
  Fiscal Class:
                                    Totals
Totals:              5.0375         764.00         769.0375     09/23/10

          GL Cost Data (GL Cost Source Site: 10-100 / Set: Standard)
Element            This Level      Lower Level          Total Pri Category A/O
---------- --------------- --------------- --------------- --- -------- ---
Material               0.00          695.00          695.00 Yes Material No
Labor                 3.875           0.00            3.875 Yes Labor    No
Burden               1.1625           0.00           1.1625 Yes Burden   No
Overhead               0.00          69.00            69.00 Yes Overhead No
Subcontr               0.00           0.00             0.00 Yes Subcontr No

                                    Totals
Totals:              5.0375         764.00         769.0375     09/23/10

          Current Cost Data (GL Cost Source Site: 10-100 / Set: Current)
Element            This Level      Lower Level          Total Pri Category A/O
---------- --------------- --------------- --------------- --- -------- ---
Material               0.00          695.00          695.00 Yes Material No
Labor                 3.875           0.00            3.875 Yes Labor    No
Burden               1.1625           0.00           1.1625 Yes Burden   No
Overhead               0.00          69.00            69.00 Yes Overhead No
Subcontr               0.00           0.00             0.00 Yes Subcontr No
```

Review the Item Site Cost Inquiry (1.4.10) for item 01050 at site 10-100 to verify the current costs have been copied to the GL cost set.

```
                Item-Site Cost Inquiry                         09/2

  Item Number: 60052              High Performance CPU
     Inv Site: 10-100      UM: EA                        Output: PAGE

                           Item Price Data
         Price: 450.00             Tax: No     Tax Class:
 Fiscal Class:

                                 Totals
Totals:              550.00         0.00         550.00     09/23/10

        GL Cost Data (GL Cost Source Site: 10-100 / Set: Standard)
Element          This Level      Lower Level          Total Pri Category A/O
----------    ---------------   ---------------   --------------- --- -------- ---
Material          500.00             0.00            500.00 Yes Material  No
Labor               0.00             0.00              0.00 Yes Labor     No
Burden              0.00             0.00              0.00 Yes Burden    No
Overhead           50.00             0.00             50.00 Yes Overhead  No
Subcontr            0.00             0.00              0.00 Yes Subcontr  No

                                 Totals
Totals:              550.00         0.00         550.00     09/23/10

        Current Cost Data (GL Cost Source Site: 10-100 / Set: Current)
Element          This Level      Lower Level          Total Pri Category A/O
----------    ---------------   ---------------   --------------- --- -------- ---
Material          500.00             0.00            500.00 Yes Material  No
Labor               0.00             0.00              0.00 Yes Labor     No
Burden              0.00             0.00              0.00 Yes Burden    No
Overhead           50.00             0.00             50.00 Yes Overhead  No
Subcontr            0.00             0.00              0.00 Yes Subcontr  No
```

At this point all costs at all levels in both the GL Cost Set and the Current Cost Set should be equal. You can check a few other items to verify the transaction worked as expected. The Item Site Cost Inquiry for the 60052 High Performance CPU is shown by example.

```
                    Item-Site Cost Inquiry                         09/2

   Item Number: 60052              High Performance CPU
      Inv Site: 10-100      UM: EA                      Output: PAGE

                          Item Price Data
          Price: 450.00             Tax: No    Tax Class:
   Fiscal Class:
                                  Totals
  Totals:           550.00           0.00         550.00     09/23/10

          GL Cost Data (GL Cost Source Site: 10-100 / Set: Standard)
  Element         This Level      Lower Level        Total Pri Category A/O
  ----------      ------------    ------------    -----------  --- --------  ---
  Material          500.00           0.00          500.00 Yes Material No
  Labor               0.00           0.00            0.00 Yes Labor    No
  Burden              0.00           0.00            0.00 Yes Burden   No
  Overhead           50.00           0.00           50.00 Yes Overhead No
  Subcontr            0.00           0.00            0.00 Yes Subcontr No

                                  Totals
  Totals:           550.00           0.00         550.00     09/23/10

          Current Cost Data (GL Cost Source Site: 10-100 / Set: Current)
  Element         This Level      Lower Level        Total Pri Category A/O
  ----------      ------------    ------------    -----------  --- --------  ---
  Material          500.00           0.00          500.00 Yes Material No
  Labor               0.00           0.00            0.00 Yes Labor    No
  Burden              0.00           0.00            0.00 Yes Burden   No
  Overhead           50.00           0.00           50.00 Yes Overhead No
  Subcontr            0.00           0.00            0.00 Yes Subcontr No
```
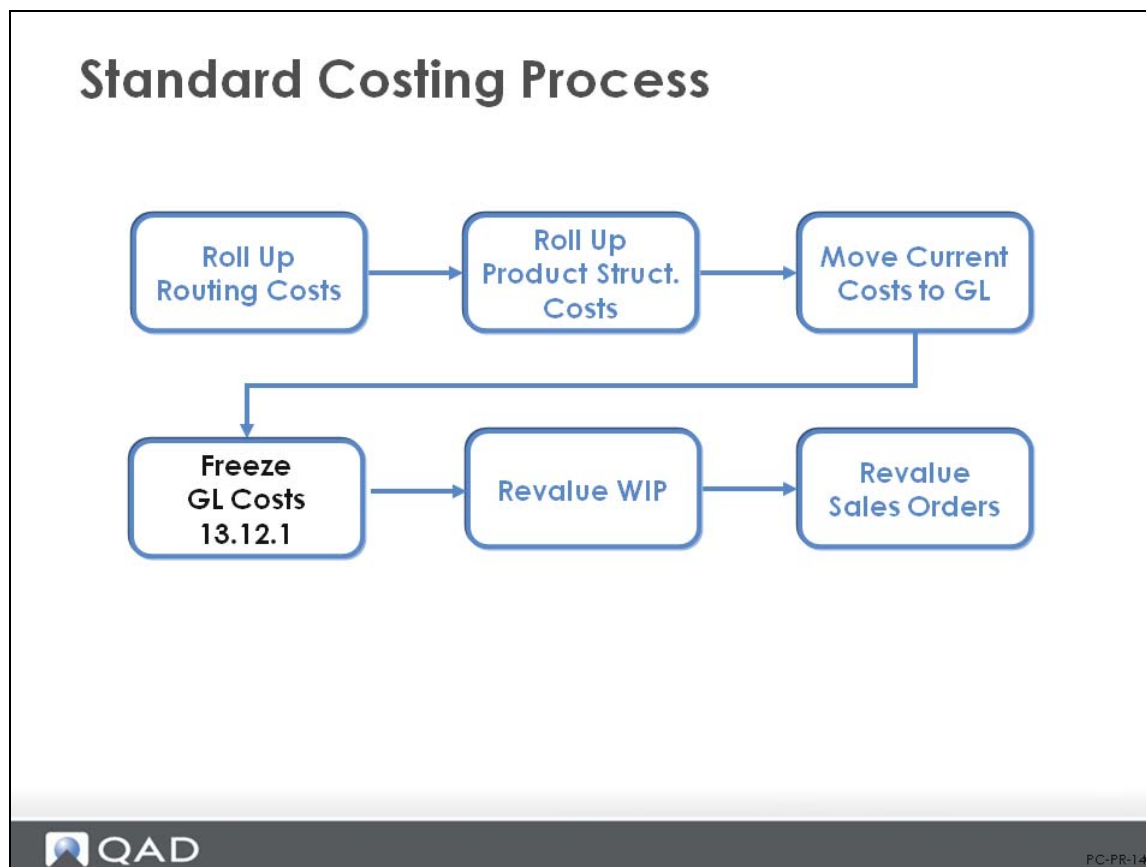
Freeze GL Costs

Once standard costs are established, you can freeze them. For example, you can set standards or create a reference cost set that won't change over the year. Any cost set can be frozen. Running the Cost Roll-Up Freeze/Unfreeze (13.12.1) simply marks item costs for this cost set and site as frozen. When routing and product structure cost roll-up functions encounter an item with frozen cost, they use that cost rather than recalculating it.

The reason for doing this is best illustrated by an example. If you have a common manufactured subassembly X that is used in products A and B, and you add another product C that uses this subassembly, when you roll up the cost of product C, the system will automatically roll up the cost of all of C's components first, including subassembly X. And, if the product structure/BOM or routing has changed in any way, subassembly X can get a new cost, meaning that you will also need to recalculate costs of items A and B. If you do not want this to happen, use Cost Freeze to freeze the cost of manufactured subassemblies such as item X.

Freezing your costs can also speed up roll-up calculations. Once item cost is calculated and frozen, all subsequent cost roll-up calculations at this site for this cost set simply use the frozen cost.

Note   The freezing process requires careful control to ensure that subassemblies that do require rolling up are unfrozen. It could be difficult to carry out this check on complex BOM structures.

Warning   The cost freeze only prevents costs from being recalculated by the system. It does not prevent manual changes in item cost data maintenance functions, cost set copy functions, or operation cost calculation.
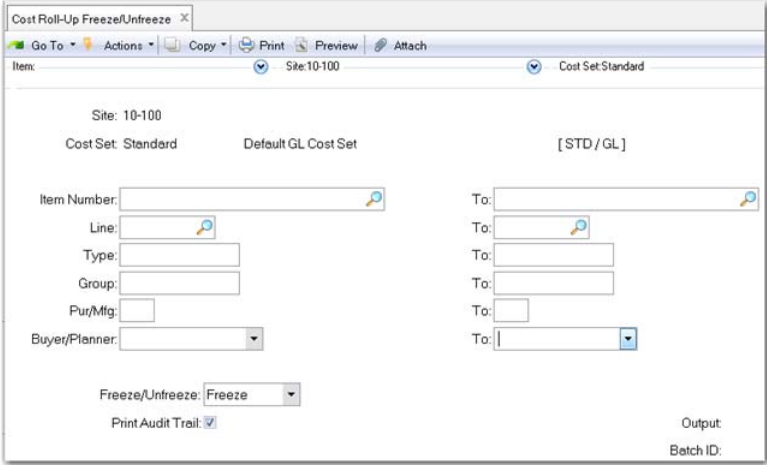
Cost Unfreeze

When frozen costs need to be recalculated using the roll-up functions, simply run Cost Freeze/Unfreeze to mark the costs as no longer frozen. Or copy the costs to another cost set and roll up that cost set.

Use the Cost Roll-Up Freeze Report (13.12.2) to review cost total for items, when updated, and whether costs are frozen or unfrozen.

Cost Roll-Up Freeze/Unfreeze Screen

Cost Roll-Up Freeze/Unfreeze

- Sets costs so roll-up functions do not recalculate
- Used in accordance with your setting of standards
- Speeds up the roll-up calculations
- Cost may still be over-ridden manually
- Unfreeze when setting new standards

PC-PR-150

Key fields in Cost Roll Up Freeze Unfreeze (13.12.1) are:

Item Number / Prod Line / Item Type / Group / Pur/Mfg / Buyer/Planner. The selection criteria allows you to freeze (or unfreeze) costs of specific types of items.

Freeze/Unfreeze. Freezes or unfreezes item costs by cost set against roll-ups, usually after roll-ups have been performed.

Exercise 14: Freeze GL Cost Set

Once the GL Cost Set is updated you will want to freeze it to prevent roll-ups from recalculating costs. This also speeds up roll-up calculations for new items.

1   Use Cost Roll Up Freeze/Unfreeze (13.12.1) to freeze the GL Cost Set at Site 10-100. Leave Item Number from / to fields blank to freeze all items. This function is a toggle. If the cost set is frozen it unfreezes it. If its unfrozen it freezes it.

The practice in many companies is to maintain current cost on an ongoing basis and on a periodic basis, Unfreeze the GL Cost set and copy the current cost set to the GL cost set, (establishing a new standard) then refreeze the GL cost set.

Standard Costing Process
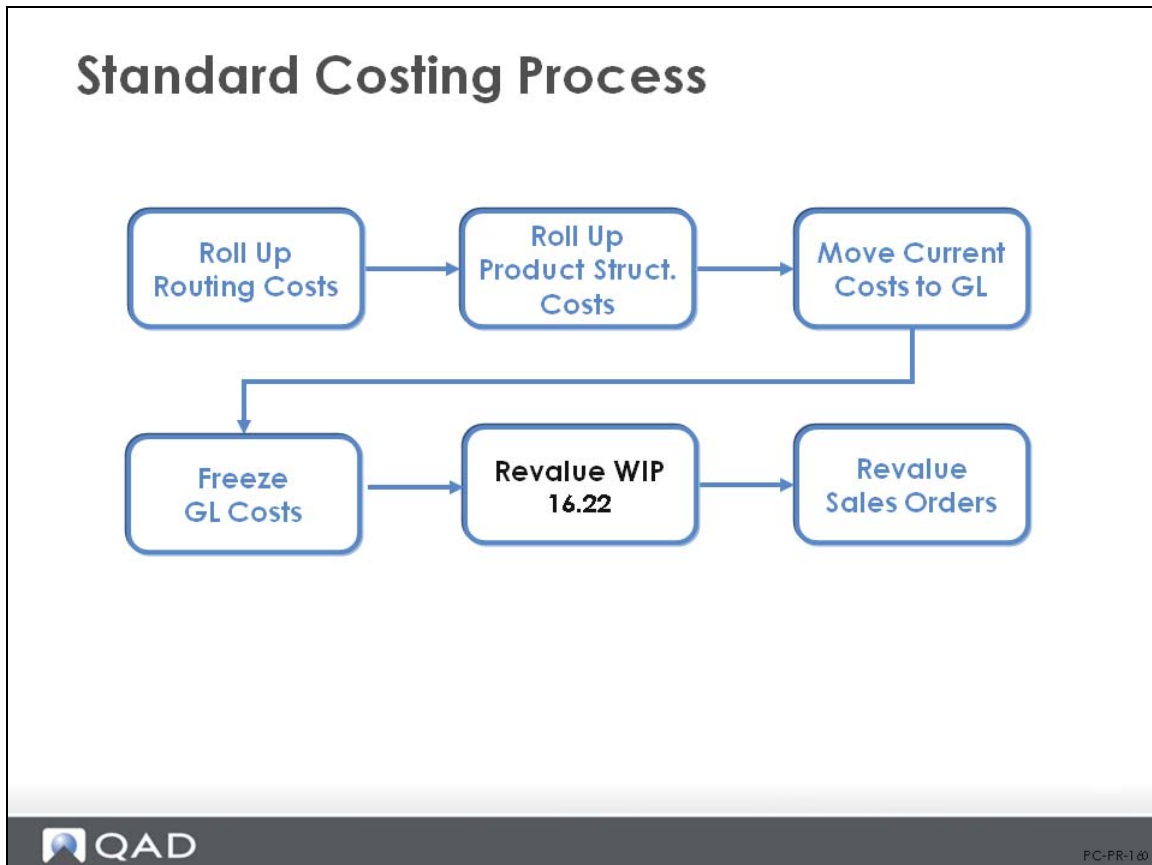
Revalue WIP

Standard Costing Process
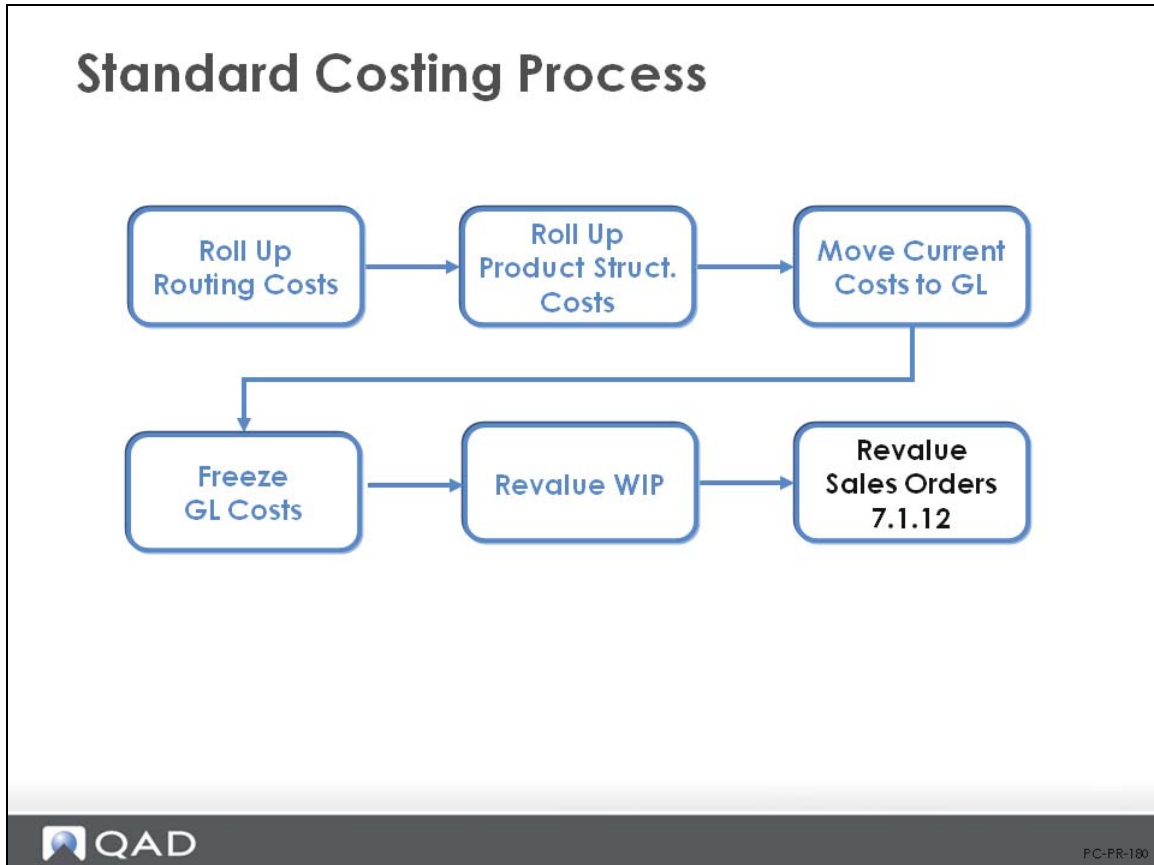
Revalue Sales Order Cost

The system uses the prevailing GL cost when a sales order line item is shipped and also changes
the cost in the sales order line item record. However, GL costs on open sales order item records
entered before the cost change are not automatically changed when GL costs are changed. This
situation could impact any reports that show margin. Consequently, you can use Sales Order Cost
Revaluation (7.1.12) to change the GL cost of these records so that gross margin reports will
reflect the proper difference between GL costs and selling price.

Use the Sales Order Gross Margin Report (7.15.5) to see the gross margin for all open sales order
line item quantities by line item and order. Gross margin is based on the net price charged for the
item and the item cost as stored on the order as it is entered.

Appendix A

Variances and Components Reference

Purchase-Related Variances

Variance	Calculation Method

Purchase Price
Calculated at:
    PO Receipts (5.13.1)
Reports:
    Transaction Receipts Report (5.9.14)
    Transactions Detail Inquiry (3.21.1)
	[PO Unit Cost – (GL Unit Cost – OH)] * PO Qty Received

AP Rate
Calculated at:
    Supplier Invoice Create (28.1.1.1)
Reports:
    Matching Variance Report (28.2.7)
    Transactions Detail Inquiry (3.21.1)
	(Invoice Unit Cost – PO Unit Cost) * Invoice Qty

AP Usage
Calculated at:
    Supplier Invoice Create (28.1.1.1)
Reports:
    Matching Variance Report (28.2.7)
    Transactions Detail Inquiry (3.21.1)
	(Invoice Qty – PO Receipt Qty) * PO Unit Cost

Manufacturing-Related Variances

Variance	Calculation Method

Material Rate
 	
Calculated at:
 	
    WO Component Issue (16.10)
    WO Receipt Backflush (16.12)
    Repetitive Backflush (18.22.13)
 	
Reports:
 	
    Work Order Cost Report (16.3.4)
    Transactions Detail Inquiry (3.21.1)
	(WO BOM Unit Cost at Issue – GL Unit Cost) * Actual Qty Issued

Material Usage
 	
Calculated at:
 	
    WO Accounting Close (16.21)
    Cumulative Order Close (18.22.10)
    Post Accumulated Usage Variances (18.22.9)
 	
Reports:
 	
    Work Order Cost Report (16.3.4)
    Transactions Detail Inquiry (3.21.1)
    Rep Operations Accounting Report (18.22.4.9)
	{Actual Qty Issued – [qty per * (qty completed + qty rejected)]} * GL Unit Cost

Labor Rate
 	
Calculated at:
 	
    SFC Feedback (16.20.1), (16.20.2), (16.20.3)
 	
Can be deferred until:
 	
    WO Receipt (16.11), (16.12)
    Repetitive Backflush (18.22.13)
 	
Reports:
 	
    Work Order Cost Report (16.3.4)
    Operations Accounting Report (16.20.13.10)
    Rep Operations Accounting Report (18.22.4.9)
	Per Operation:
	
	[(Actual Setup Rate – Std Setup Rate) * Actual Setup Hrs] + [(Actual Run Rate – Std Run Rate) * Actual Run Hrs]
	
	Setup and run rates are equal to the payroll rate (defined in 14.13.21) or the work center rate if payroll is not set up.
	
	No variances if no labor reporting

Labor Usage
 	
Calculated at:
 	
    SFC Feedback (16.20.1), (16.20.2), (16.20.3)
 	
Can be deferred until:
 	
    WO Receipt (16.11), (16.12)
    Post Accumulated Usage Variances (18.22.9)
    Cumulative Accounting Close (18.22.10)
 	
Reports:
 	
    WO Cost Report (16.3.4)
    Operations Accounting Report (16.20.13.10)
    Rep Operations Accounting Report (18.22.4.9)
	Per Operation:
	
	[(Actual Setup Hrs – Std Setup Hrs) * Std Setup Rate] + [(Actual Run Hrs – Std Run Hrs) * Std Run Rate]
	
	Std Run Hrs =
	Std Run Hrs * (Qty Completed + Qty Rejected)

Variance	Calculation Method

Burden Rate
 	
Calculated at:
 	
      SFC Feedback (16.20.1), (16.20.2), (16.20.3)
      WO Receipt (16.11), (16.12)
      Repetitive Backflush (18.22.13)
 	
Reports:
 	
   WO Cost Report (16.3.4)
   Operations Accounting Report (16.20.13.10)
   Rep Operations Accounting Report (18.22.4.9)
	Per Operation:
	
	[(Actual Setup Bdn – Std Setup Bdn) * Actual Setup Hrs] + [(Actual Run Bdn – Std Run Bdn) * Actual Run Hrs]
	
	Actual Setup Bdn = (Actual Setup Rate * Lbr Bdn%) + Lbr Bdn Rate + (Mach Bdn Rate * Mach/Op)
	
	Std Setup Bdn = (Std Setup Rate * Lbr Bdn%) + Lbr Bdn Rate + (Mach Bdn Rate * Mach/Op)
	
	Actual Run Bdn = (Actual Run Rate * Lbr Bdn%) + Lbr Bdn Rate + Mach Bdn Rate
	
	Std Run Bdn = (Std Run Rate * Lbr Bdn%) + Lbr Bdn Rate + Mach Bdn Rate

Burden Usage
 	
Calculated at:
 	
   SFC Feedback (16.20.1), (16.20.2), (16.20.3)
 	
Can be deferred until:
 	
      WO Receipt (16.11), (16.12)
      Post Accumulated Usage Variance (18.22.9)
      Cumulative Order Close (18.22.10)
 	
Reports:
 	
   WO Cost Report (16.3.4)
   Operations Accounting Report (16.20.13.10)
   Rep Operations Accounting Report (18.22.4.9)
	Per Operation:
	
	[(Act Setup Hrs – Std Setup Hrs) * Std Setup Bdn] + [(Act Run Hrs – Std Run Hrs) * Std Run Bdn]
	
	Std Setup Bdn = (Std Setup Rate * Lbr Bdn%) + Lbr Bdn Rate + (Mach Bdn Rate * Mach/Op)
	
	Std Run Bdn = (Std Run Rate * Lbr Bdn%) + Lbr Bdn Rate + Mach Bdn Rate

Subcontract Rate Calculated at: PO Receipt (5.13.1)	(Subcontract PO Unit Cost – Subcontract Unit Cost from Routing) * Qty Received

Subcontract Usage
 	
Calculated at:
 	
   WO Accounting Close (16.21)
   Post Accumulated Usage Variance (18.22.9)
   Cumulative Order Close (18.22.10)
	[Qty Received – (Op Qty Completed + Op Qty Rejected)] * Subcontract Unit Cost from Routing

Method
 	
Calculated at:
 	
   WO Accounting Close (16.21)
   Cumulative Accounting Close (18.22.10)
	Balance of WO/ID value remaining

Mix (Co/By-Products) Calculated at: WO Accounting Close (16.21)	[Order Qty – (Receipt Qty + Scrap Qty)] * GL Unit Cost

Variances by Transaction Flow

Variances by Transaction Flow
PO Receipts
Purchase Price Variance
*[PO Unit Cost – (GL Unit Cost – OH)] * PO Qty Received*
Subcontract Rate Variance
*(Subcontract PO Unit Cost – Subcontract Unit Cost from Routing) * Qty Received*
Receiver Matching
Accounts Payable Rate Variance
*(Invoice Unit Cost – PO Unit Cost) * Invoice Quantity*
Accounts Payable Usage Variance
*(Invoice Qty – PO Receipt Qty) * PO Unit Cost*
Work Order Component Issue
Material Rate Variance
*(WO BOM Unit Cost at Issue – GL Unit Cost) * Actual Qty Issued*
Labor Feedback
Labor Rate Variance
*[(Actual Setup Rate – Std Setup Rate) * Actual Setup Hrs] + [(Actual Run Rate – Std Run Rate) * Actual Run Hrs]*
Labor Usage Variance
*[(Actual Setup Hrs – Std Setup Hrs) * Std Setup Rate] + [(Actual Run Hrs – *Std Run Hrs) * Std Run Rate]*
**Std Run Hrs = Std Run Hrs * (Qty Completed + Qty Rejected)*
Burden Rate Variance
*[(Actual Setup Bdn – Std Setup Bdn) * Actual Setup Hrs] +* *[(Actual Run Bdn – Std Run Bdn) * Actual Run Hrs]*
Burden Usage Variance
*[(Act Setup Hrs – Std Setup Hrs) * Setup Bdn] + [(Act Run Hrs – Std Run Hrs) * Run Bdn]*
Work Order Accounting Close
Subcontract Usage Variance
*[Qty Received – (Op Qty Completed + Op Qty Rejected)] * Subcontract Unit Cost from Routing*
Material Usage Variance
*{Actual Qty Issued – [qty per * (qty completed + qty rejected)]} * GL Unit Cost*
Method Variance

Components of Item Cost

Components of Item Cost	
Material	
Dependent On	*Defined In*
Material/Purchase Price	Item Master Maintenance (1.4.1), (1.4.9), (1.4.18)
Quantity Per	Product Structure Maintenance (13.5), (15.5)
Scrap %	Product Structure Maintenance (13.5), (15.5)
Phantom	Item Master Maintenance (1.4.1), (1.4.7), (1.4.17)
Pur/Mfg	Item Master Maintenance (1.4.1), (1.4.7), (1.4.17)
Structure Type	Product Structure Maintenance (13.5)
Yield %	Routing Maintenance (14.13.1)
Labor	
Dependent On	*Defined In*
Work Center Labor Rates	Work Center Maintenance (14.5)
Work Center Setup Rates	Work Center Maintenance (14.5)
Run Time per Unit	Routing Maintenance (14.13.1), (14.13.2)
Setup Time per Lot	Routing Maintenance (14.13.1), (14.13.2)
Order Quantity	Item Master Maintenance (1.4.1)
Subcontract Cost	Routing Maintenance (14.13.1)
Burden	
Dependent On	*Defined In*
Work Center Labor Burden Rates	Work Center Maintenance (14.5)
Work Center Labor Burden Percent	Work Center Maintenance (14.5)
Work Center Machine Burden Rate	Work Center Maintenance (14.5)
Machines/Operation	Work Center Maintenance (14.5)
All of the items under Labor (above)	

Product Information Resources

QAD offers a number of online resources to help you get more information about using QAD products.

QAD Forums (community.qad.com)
Ask questions and share information with other members of the user community, including QAD experts.

QAD Knowledgebase (knowledgebase.qad.com)*
Search for answers, tips, or solutions related to any QAD product or topic.

QAD Document Library (www.qad.com/documentlibrary)
Get browser-based access to user guides, release notes, training guides, and so on; use powerful search features to find the document you want, then read online, or download and print PDF.

QAD Learning Center (learning.qad.com)*
Visit QAD's one-stop destination for all courses and training materials.

*Log-in required