



QAD Enterprise Application  
Enterprise & Standard Edition

**Training Guide**  
**Work Centers, Routings**  
**& WO Subcontracting**

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QAD Enterprise & Standard Edition  
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# **About This Course**

## Course Description

QAD designed this course to cover the basics of preparing to implement the work centers and routing functions of QAD Enterprise Applications, as well as work order subcontracting. The course includes

- An introduction to the Work Centers and Routings module
- An overview of key business issues to consider before setting up these functions
- Setting up the work centers and routing module
- Processing subcontract operations
- Activities and exercises throughout the course
  - Students practice key concepts and processes in work centers and subcontracting operations

## Course Objectives

By the end of this course students should learn how to:

- Analyze some key business decisions before setting up work centers and routings
- Set up and operate work centers and routings and work order subcontracting

## Audience

- Implementation consultants and members of implementation teams
- Key users

## Prerequisites

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

## Course Credit

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

## QAD Resources

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

### Product Help

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

### QAD Web Resources

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

<http://www.qad.com/>

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

### QAD Learning Portal for Training Opportunities

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

### QAD Support for Product Documentation and the QAD Knowledgebase

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

Choose Support under the Global Services tab.

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



CHAPTER 1

# **Introduction to Work Centers and Routings**



## Course Overview

- ▲ Introduction to work centers, routings, and work order subcontracting
- ▲ Business considerations
- ▲ Set up the shop calendar, departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
- ▲ Process subcontract operations in QAD Enterprise Applications


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## Course Overview

This course covers work centers and routings and work order subcontracting.

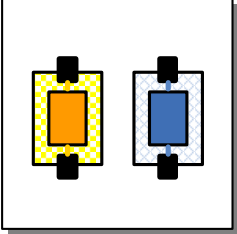
- Work centers and routings require initial entry and occasional administrative attention
- Subcontracting, although not a strict matter of work centers and routings, is treated here because it requires special operations in the routings
  - Subcontracting processing also requires knowledge of purchasing and shop floor control; this course does not cover these topics



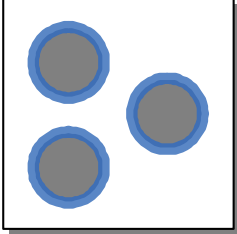
## Work Centers

**Production facilities that perform tasks**


**Grinding**



**Smoothing**



**Assembly**

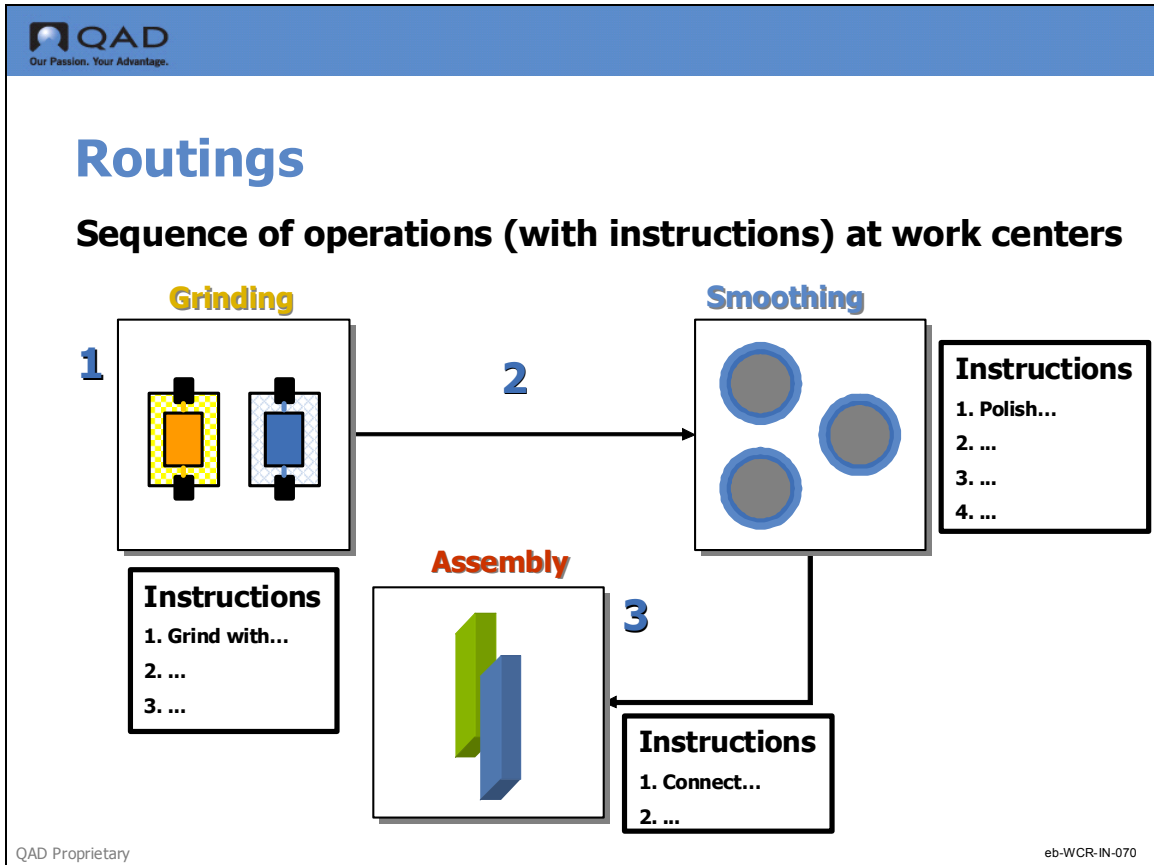


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## Work Centers

A work center is a production area with one or more people or machines having similar capabilities.

- QAD Enterprise Applications uses work centers for scheduling, planning, and determining costs for GL transactions
- Work centers and operations work in conjunction with the shop calendar, which can be used to set up work center-specific schedules



## Routings

Routings list the operations required for manufacturing a product. They also indicate the work center for each operation. They can be accompanied by printed instructions entered in as master comments.

- Each routing normally consists of one or more operations
- Routing operations may not be necessary when:
  - Item lead times are very short
  - Total item costs consist mainly of material and overhead and the labor component is small
  - Capacity can be easily managed
  - The repetitive module is not used

- Each operation involves different machines, tools, skills, and tasks, such as grinding, smoothing, and assembly
- In process industries, routings are called processes



## Terminology

- ▲ Alternate Routings
- ▲ Backflush
- ▲ Queue Time
- ▲ Wait Time
- ▲ Move Time
- ▲ Yield
- ▲ Yield Percent
- ▲ Operation / Process Yield
- ▲ Subcontract



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## Terminology

### Alternate Routing.

- Alternate routing is a routing used instead of the primary routing
  - Results in an identical item

### Backflush.

- 1 Backflushing is the automatic recording of component/raw material issues based on the quantity of end items received, and the quantity per of the component from the end items bill of material. It can be used for both work order and repetitive production.
- 2 Backflushing calculates the quantity completed for the base process using Work Order Receipt Backflush.

The backflush quantity for the base process is used to calculate the issue (backflush) quantities for the co-products and by-products.

**Queue Time.**

Queue time is the time a work order waits at a work center before being worked on. Increases in queue time result in direct increases to manufacturing lead time.

**Wait Time.**

Wait time is the time a work order must wait after it has been worked on, but before it is moved to the next operation (drying, curing, cooling, for example).

**Move Time.**

The time required to move work from one work center/operation to the next

**Yield.**

Yield is the ratio of usable output from a process to its input.

**Yield Percent.**

Yield percent is the percentage of acceptable quality of a manufacturing order.

**Operation/Process Yield.**

Operation/process yield is the ratio of usable output from a process, process stage, or operation to the input quantity, usually expressed as a percentage.

**Subcontract.**

Using outside vendors for all or some operations on a work order is called subcontracting. Subcontract costs are recorded on the routing for a product.

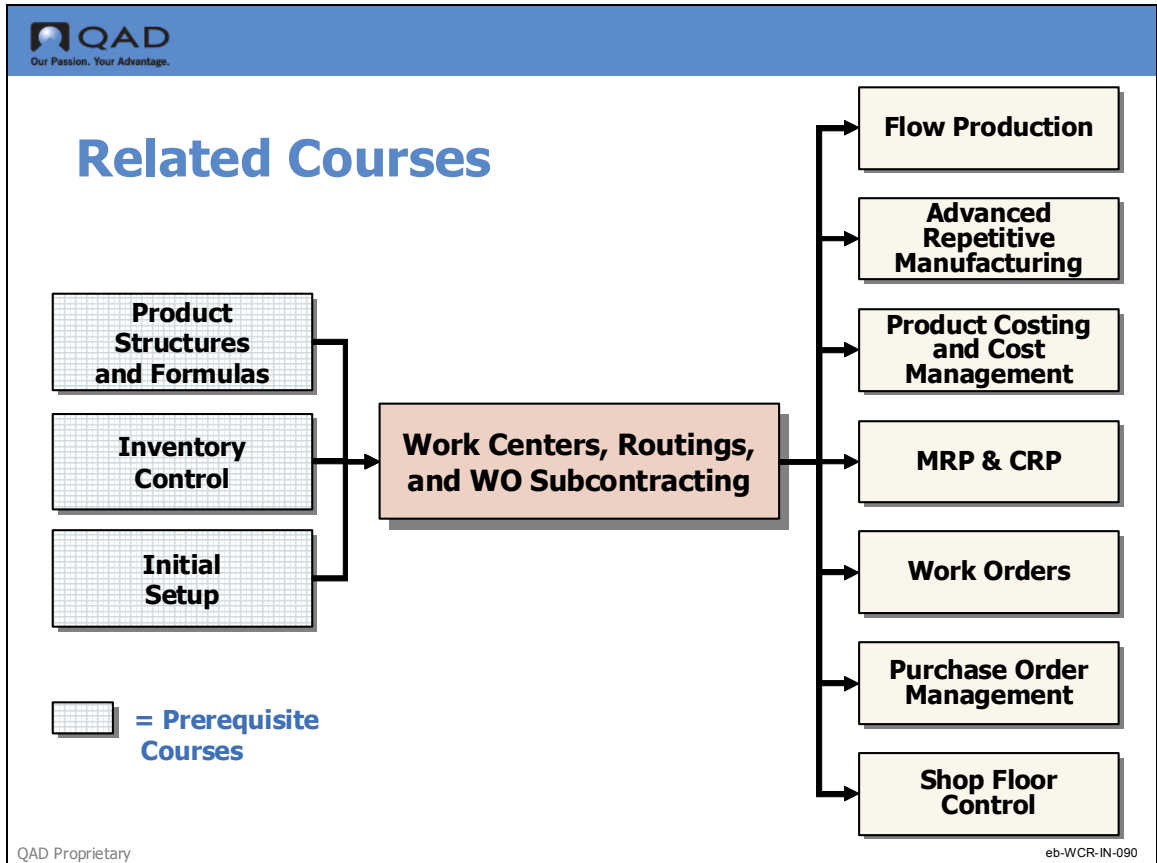


## Course Objectives

### **In this course you learn how to:**

- ▲ Identify some key business considerations before setting up work centers, routings, and WO subcontracting in QAD Enterprise Applications
- ▲ Set up departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
- ▲ Process subcontract operations in QAD Enterprise Applications

## Course Objectives



## Related Courses

Work centers and routings require that product structures and formulas be in place.

- The section in this course on subcontracting requires superficial knowledge of purchasing and receiving



## Course Overview

- ✓ Introduction to work centers, routings, and WO subcontracting in QAD Enterprise Applications
  - ▲ Business considerations
  - ▲ Set up the shop calendar, departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
  - ▲ Process subcontract operations in QAD Enterprise Applications

CHAPTER 2

# **Business Considerations**



## Business Considerations

### In this course you learn how to:

- ▲ Identify some key business considerations before setting up work centers, routings, and WO subcontracting in QAD Enterprise Applications
- ▲ Set up departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
- ▲ Process subcontract operations in QAD Enterprise Applications

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## Introduction to Business Considerations

Your company's procedures and policies can affect the way you should set up QAD Enterprise Applications. This section covers some issues you should consider before setting up your work centers and routings.



## Business Issues

- ▲ Repetitive
- ▲ Shop Floor Control
- ▲ Subcontracting
- ▲ Capacity Requirements Planning
- ▲ Burden/Labor Rates

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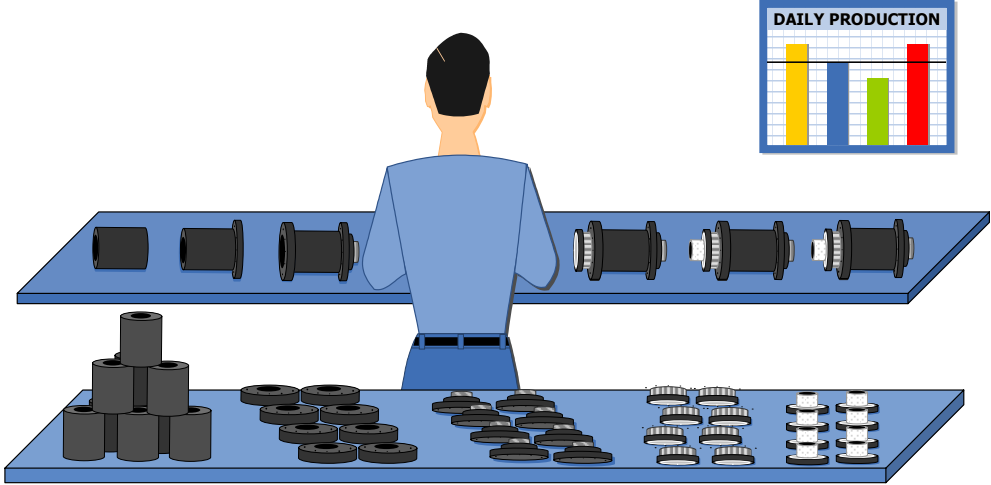
### Business Issues

These are some of the business issues you should consider before beginning the implementation. We cover each one on the following pages.

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## Repetitive and Shop Floor Control

The repetitive and shop floor control modules in QAD Enterprise Applications require routing operations



The illustration shows a worker from behind, standing at a workstation. On the top shelf, there are three large cylindrical components. On the bottom shelf, there are stacks of smaller cylindrical components. To the right, a 'DAILY PRODUCTION' chart displays four bars: yellow, blue, green, and red.

Category	Production Level
Yellow	High
Blue	Medium
Green	Low
Red	High

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## Repetitive and Shop Floor Control

Routing operations are required in repetitive and shop floor control for:

- Scheduling operations for repetitive
- Backflushing components in the repetitive module
- Obtaining operation feedback in shop floor control and repetitive



## Repetitive and Shop Floor Control

The repetitive and shop floor control modules in QAD Enterprise Applications require routing operations

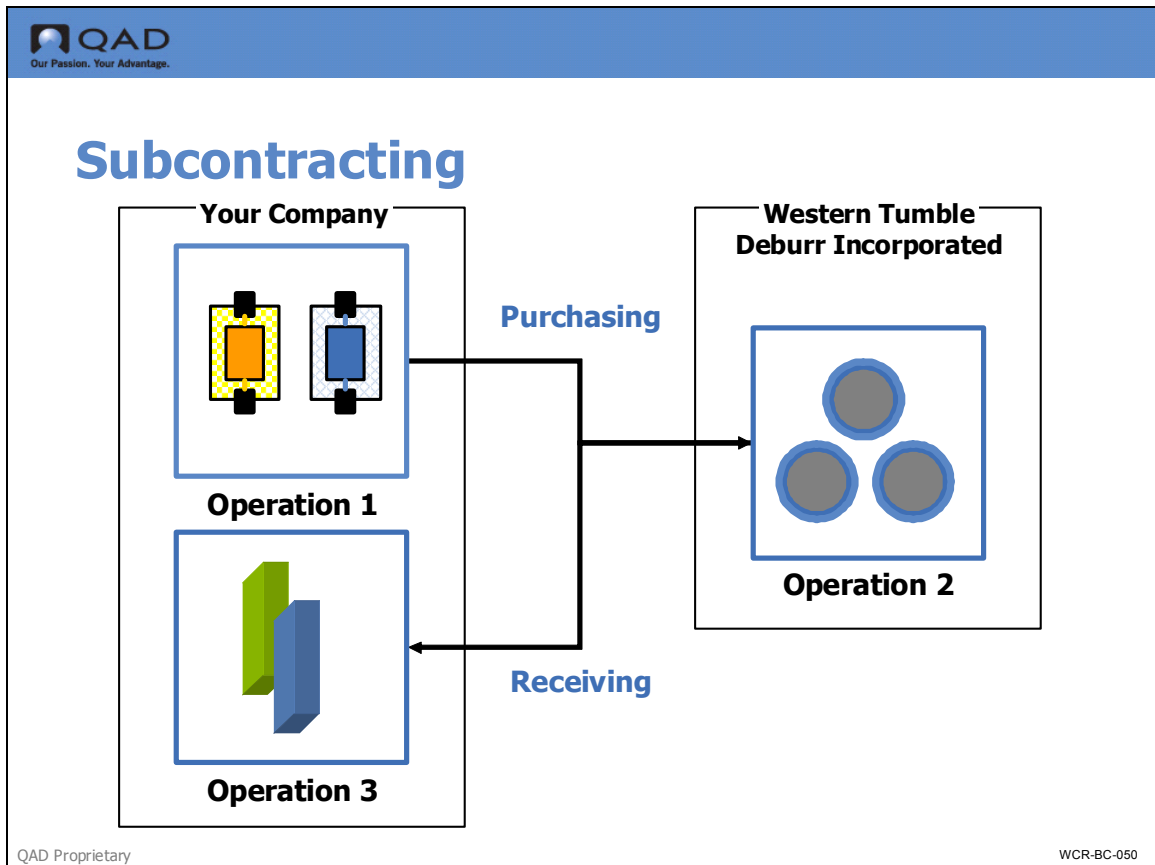
### When may routing operations not be required?

- When control of manufacturing processes and related costs and capacities is not required or desired
- When item lead times are very short
- If the total item cost is mostly material and overhead and the labor component is low
- If capacity is easily managed
- When the repetitive module is not in use

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**Note** You cannot establish standard costs with Routing Cost Roll-Up

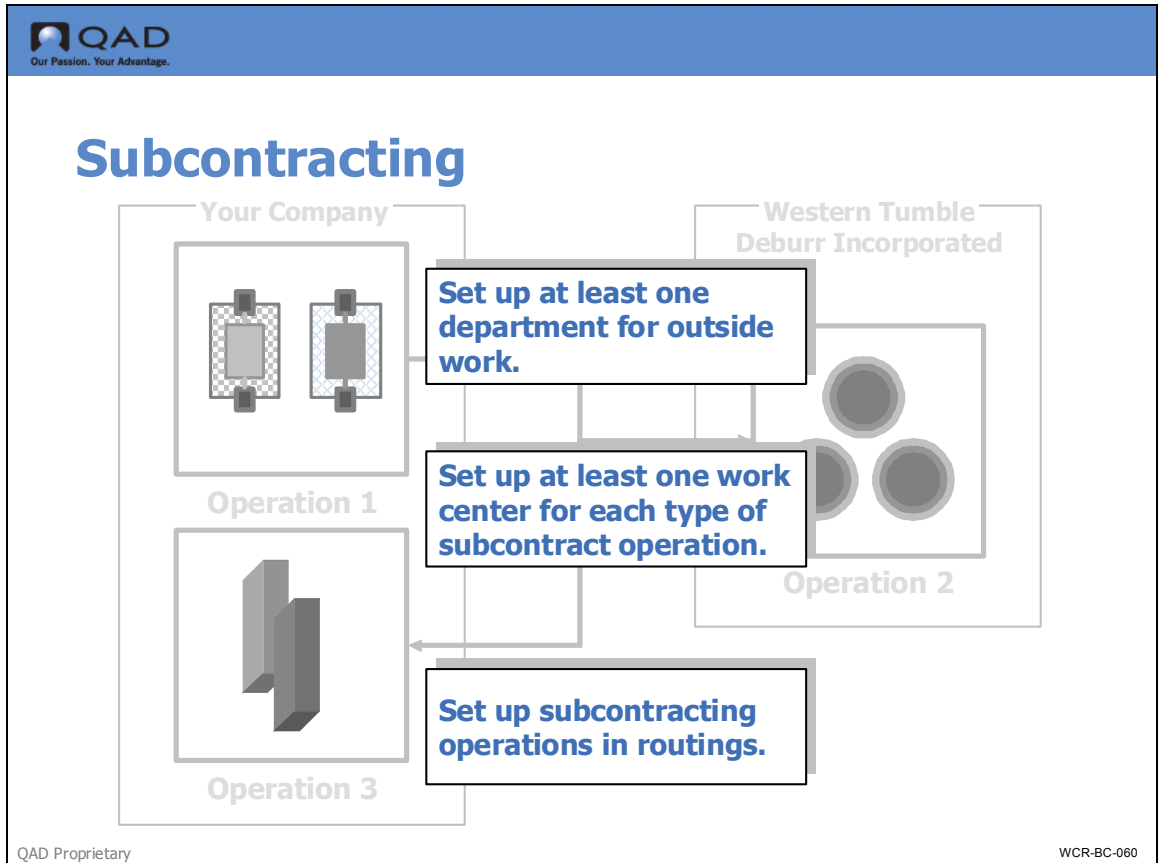


## Subcontracting

Subcontracting involves the processing of your materials by an outside supplier. For example, companies send raw materials to the supplier to be manufactured or assembled and then brought back in house. The raw materials are on the books: the supplier does not own them.

This process spans modules in QAD Enterprise Applications, using purchasing, manufacturing, and shop floor control programs, as well as the repetitive functionality.

- 1 You set up an operation for the subcontracted work.
- 2 When the work moves to the subcontracted operation, you create a purchase order and refer the line item back to the operation as a line type "S".
- 3 You receive the work and move it to the next operation.



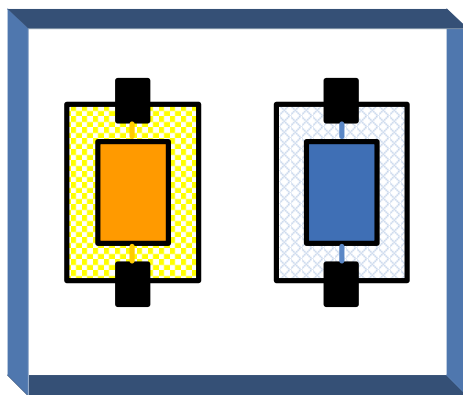
Some manufacturing systems use item numbers to account for subcontract costs. QAD Enterprise Applications uses routing operations to plan and track these costs.

See in this training guide: [Work Order Subcontract Processing](#) on page 113



## Capacity Requirements Planning (CRP)

**Work centers are the basic unit for CRP**



**Work center capacity equals**  
calendar hours available  $\times$  number of machines

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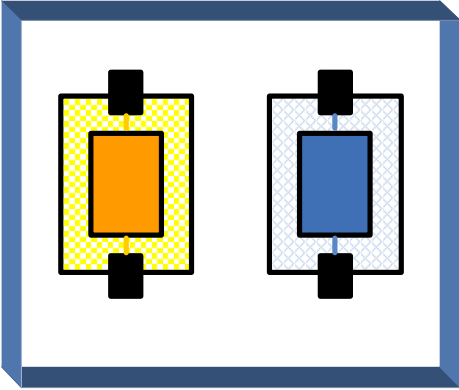
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## Capacity Requirements Planning

You can set up work-center-specific hour capacity in the shop calendar.

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## Burden/Labor Rates



- Machine burden rate
- Labor burden rate
- Labor burden %
- Labor rates

**The system uses these elements in calculating item costs**

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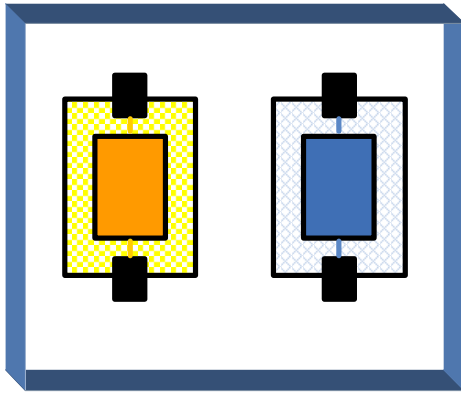
## Burden/Labor Rates

Burden/labor rates are generally maintained by cost accountants. Typically, they are considered the variable portion of overhead related directly to production hours.

In contrast, overhead is considered a fixed cost and is applied to inventory at the time of work order or purchase order receipt.



## Burden/Labor Rates



**Burden costs use**

- **Machine burden rate**
- **Labor burden rate**
- **Labor burden %**

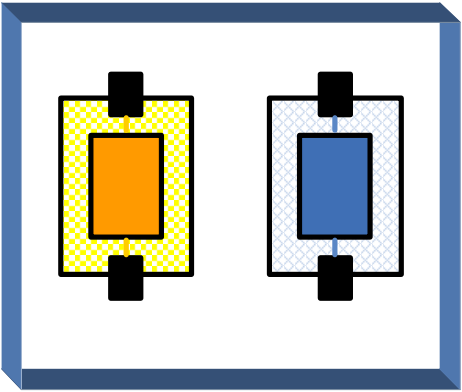
**Machine burden rate equals**

(standard setup hours  $\times$  number of machines + standard run hours)  
 $\times$  work center machine burden rate

## Machine Burden Rate



# Burden/Labor Rates




- Burden costs use**
- ✓ Machine burden rate
  - Labor burden rate
  - Labor burden %

## Labor burden rate equals

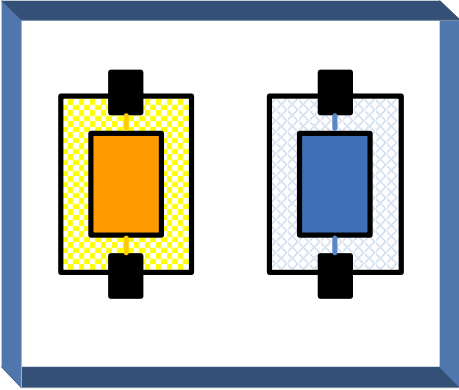
$$\text{(standard setup hours/order quantity + standard run hours)} \times \text{work center labor burden rate}$$

## Labor Burden Rate





## Burden/Labor Rates



**Burden costs use**

- ✓ Machine burden rate
- ✓ Labor burden rate

➔ • **Labor burden %**

**Labor burden percent equals**

(standard setup hours x work center setup rate x labor burden %)

+

(standard run hours x work center labor rate x labor burden %)

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### Labor Burden

**Note** If a Labor Burden Rate is also entered it is added to Total Burden.



## Course Overview

- ✓ Introduction to work centers and routings
- ✓ Business considerations
  - ▲ Set up departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
  - ▲ Process subcontract operations in QAD Enterprise Applications



CHAPTER 3

# **Work Centers and Routings Setup and Maintenance**




## Set up Work Centers and Routings


### In this section you learn how to:

- ▲ Identify some key business considerations before setting up work centers, routings, and WO subcontracting in QAD Enterprise Applications
- ▲ **Set up departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications**
- ▲ Process subcontract operations in QAD Enterprise Applications

## Set Up Work Centers and Routings



## Work Centers and Routings Process Setup and Maintenance




- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Work Centers/Routings/Process Setup and Maintenance

This work flow sequence is the recommended initial setup sequence of for work centers, routings, and processes. It is based on information that flows from one master file to another and prerequisites that need to be accomplished before setting up a file. Optional steps are noted as such.



## Work Centers and Routings Process Setup and Maintenance



- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Shop Calendar

The calendar sets the work week and the daily hours.

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## Calendar Maintenance

Calendar Maintenance x

Go To Actions Copy Print Preview

Site: PROTO Prototype Production

Work Center: Machine:

Work Day	Hours
Sunday <input type="checkbox"/>	0.00
Monday <input checked="" type="checkbox"/>	8.00
Tuesday <input checked="" type="checkbox"/>	8.00
Wednesday <input checked="" type="checkbox"/>	8.00
Thursday <input checked="" type="checkbox"/>	8.00
Friday <input checked="" type="checkbox"/>	8.00
Saturday <input type="checkbox"/>	0.00

Reference:

Start:

End: Daily Hours:

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## Calendar Maintenance

You must define at least one calendar. Calendars set the standard work week for a site and the work centers in it. Calendars provide the basis for all manufacturing scheduling functions. You can create a calendar for the entire system, for specific sites, for work centers, and for machines in work centers.

**Note** Line Schedule Workbench uses the calendar defined in Shift Maintenance

### Site

- The site where the calendar applies
- Leave this blank to create a system calendar
  - Any sites left blank then default to the system calendar

### *Work Center*

- The work center where the calendar applies
- Leave this blank to default the work center to the site calendar

### *Machine*

- The machine the calendar applies to
- Leave this blank to default the machine to the work center calendar

### *Work Day*

- Denotes for each day whether it is a work day or not
- *No* = Not a work day
  - The system schedules nothing on non-work days
- *Yes* = A work day. The system can schedule events, such as:
  - Production
  - Shipments

### *Hours*

- The total number of hours normally scheduled for all shifts to work on this day
- This should reflect actual production hours, exclusive of breaks
- This number reflects all shifts scheduled for work, which may be greater than 24 hours
- When calculating schedule due and release dates, the system only looks at scheduled work days, ignoring exceptions and holidays

Record exceptions to the normal calendar in the following three fields. These schedule:

- Overtime
- Increased shifts
- Reduced shifts
- Preventative maintenance
- Shutdowns

The number of hours specified is added or subtracted from the normal work day for each day in the range of dates specified.

**Note** Exceptions only record holidays if the holiday only applies to some work centers. If the holiday applies to all work centers, use Holiday Maintenance.

#### *Reference*


- A reference code identifying an exception to the shop calendar, usually describing the type of exception:
  - *Overtime or Shutdown*

#### *Start / End*


- The first day and last day this exception applies to
- The exception applies to all work days in the range of dates specified

#### *Daily Hours*

- The number of hours to be added or subtracted from normal scheduled work hours for the specified range of dates
- Can be positive or negative; for a shutdown on a normal work day, enter -8



## Work Centers and Routings Process Setup and Maintenance



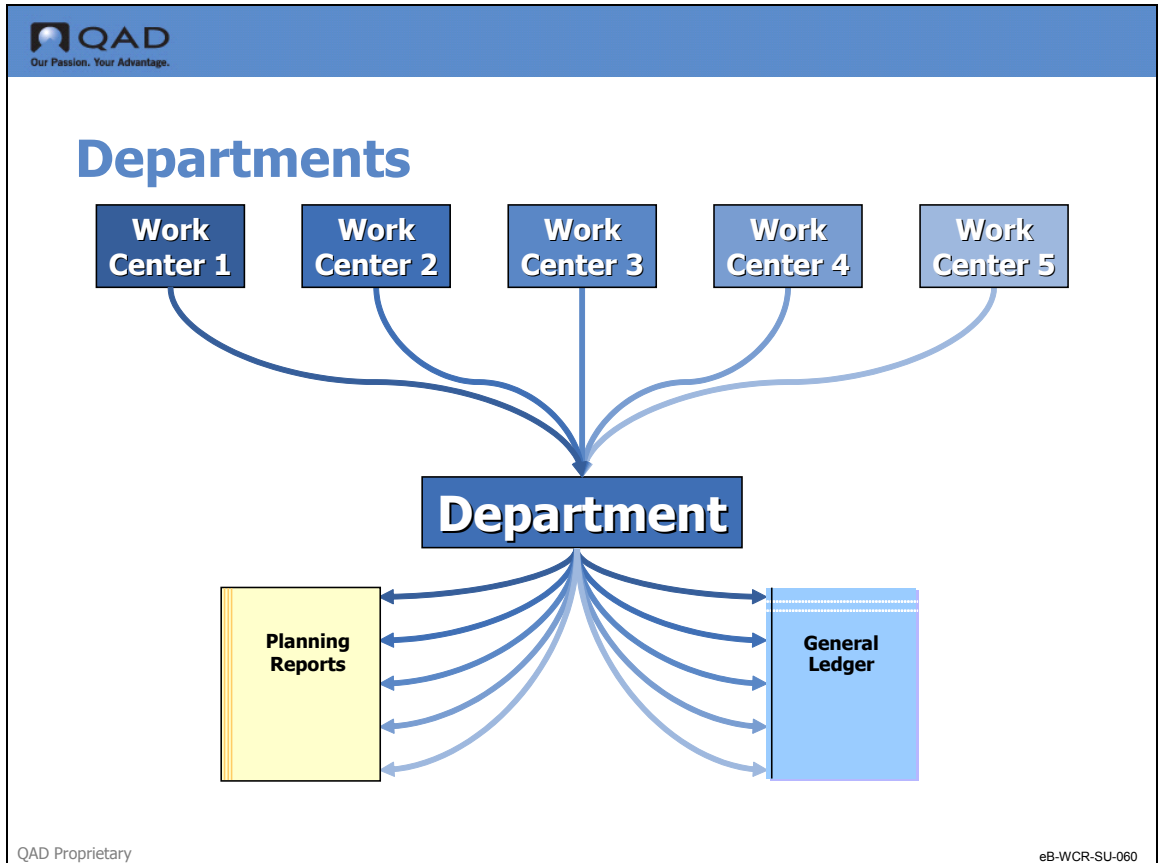
- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Departments

Departments group work centers for capacity requirements planning and general ledger (GL).



Similar to product lines, departments are used to determine the GL accounts on transactions and for summary capacity planning.

Department Maintenance

Department: PROTO

Default Sub-Account:  Override:

Default Cost Center:  Override:

Description:

Labor Capacity:

Cost of Production:	<input type="text" value="5770"/>	<input type="text" value="Cons"/>	<input type="text" value=""/>
Labor:	<input type="text" value="5100"/>	<input type="text" value="Cons"/>	<input type="text" value=""/>
Burden:	<input type="text" value="5200"/>	<input type="text" value="Cons"/>	<input type="text" value=""/>
Labor Usage Variance Acct:	<input type="text" value="5140"/>	<input type="text" value="Cons"/>	<input type="text" value="Mfg"/>
Labor Rate Variance Acct:	<input type="text" value="5150"/>	<input type="text" value="Cons"/>	<input type="text" value="Mfg"/>
Burden Usage Variance:	<input type="text" value="5240"/>	<input type="text" value="Cons"/>	<input type="text" value="Mfg"/>
Burden Rate Variance:	<input type="text" value="5250"/>	<input type="text" value="Cons"/>	<input type="text" value="Mfg"/>


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## Department Maintenance


At least one department is required before entering work centers or routings.

- Every work center must belong to one department
- A department is a grouping of work centers for purposes of reporting and accounting
- CRP calculates capacity/load by work center/machine, can display summary by department
- Labor, burden, and cost of production are tracked in the GL by department
- A department should be set up to group any subcontract work centers
- Labor capacity can only be entered manually, and should be entered - CRP uses it to determine over/under loads - it should equal the sum of the capacities of all work centers in the department, assuming the labor is transferable between work centers within the department

**Note** The labor and burden fields are for the absorption/cost centers.



## Work Centers and Routings Process Setup and Maintenance

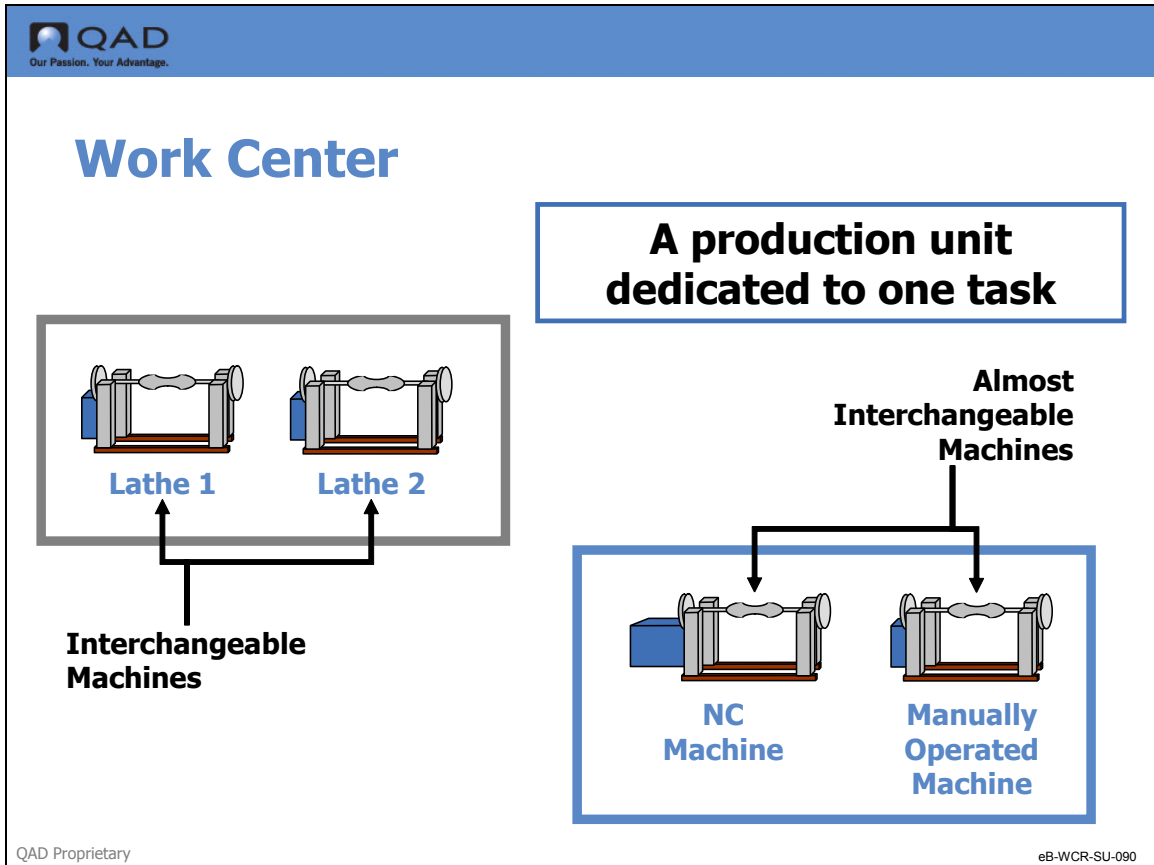


- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Work Centers

- A work center is a production facility that performs specified tasks
  - It identifies machines, groups of similar machines, people, or subcontract suppliers
  - In QAD Enterprise Applications, work centers link departments with operations
- Departments are a prerequisite to entering work centers



A Work Center is a production area with one or more people and machines. Work centers may be very specific as shown here with lathes. Or they may be very general as with manual assembly where one work center with several people may be capable of many different tasks.

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## Work Center Maintenance

Work Center Maintenance x

Go To Actions Copy Print Preview

Work Center: PROTO **Machine: 1100**

Description: Forge Press

Department: PROTO Prototype Production

Queue Time: 0.000

Wait Time: 0.0

MachyOp: 1

Setup Crew: 0.00

Run Crew: 1.000

Machines: 1.000

Mach Bdn Rate: 100.00

Setup Rate: 25.00

Labor Rate: 15.00

Labor Burden Rate: 5.00

Labor Bdn %: 25.00%

Identify individual machines if necessary

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## Work Center Maintenance

Use this function to create and modify work centers.

- For *subcontracting*, set up a work center for each type of subcontract operation or supplier. Where possible it will work best if the sub-contract work center has the same code as the supplier.
  - Set subcontract work center rate costs to zero. Subcontract costs are managed as purchase cost and are indicated on the subcontract operation in the route.
- Work center data is accessed by most manufacturing functions in QAD Enterprise Applications
  - Some static data (Description, Setup Crew, Run Crew) only prints on reports

- Work Center data controls processing in four areas:
  - *Scheduling*

When a routing operation is specified at this work center, lead time fields (Operation, Queue Time, Wait Time, and Machines per Op) default to the routings
  - *CRP*

Capacity for this work center is the number of machines in a work center multiplied by the number of available hours (from Calendar Maintenance)
  - *Costing*

Manufacturing costs are calculated in Routing Cost Roll-Up

Labor costs multiply the setup and run times at each operation by the setup rate and labor rate; burden costs use Mach Bdn Rate, Lbr Bdn Rate, and Lbr Bdn %; subcontract costs are taken from subcontract cost at the operation level
  - *Accounting*

Each work center belongs to a department, which determines the GL accounts that track variances, labor and burden costs

### *Work Center*

An alphanumeric code for the work center.

### *Machine*

A code for a machine used in the work center.

- You can leave this field blank
- Specify a machine only if there is more than one machine in the work center and they cannot be used interchangeably (that is, each machine is different or dedicated to different items)
- When machine codes are specified, each routing operation has to be assigned to a particular machine
- Capacity and load can be reviewed by machine or aggregated by work center

### *Department*

The department to which this work center is assigned.

### *Queue Time*

The standard queue time, in decimal hours, a job normally spends waiting at this work center before it is set up and processed.

- This value displays as the default when you enter a standard operation, routing operation, or process operation for this work center
- Total manufacturing lead time includes queue, setup, run, wait, and move time
  - Lead time is used for operation scheduling and capacity requirements planning
- Queue time is independent of order quantity and can be compressed in past due situations
- When scheduling operations, the system looks at the shop calendar for the work center to determine how many hours are available for queue time in each calendar period

### *Wait Time*

The standard wait time in decimal hours that a job normally spends waiting at this work center after processing has been completed.

- This value displays as the default whenever you enter a standard operation, routing operation, or process operation for this work center
- Uses for wait time include drying, cooling, aging, and curing
- Wait time is independent of order quantity
- An order must wait at least this long before it can go on to the next operation; wait time can't be skipped in past-due situations
- Wait time is expressed in hours and is not affected by the shop calendar

### *Mach/Op*

The number of machines at this work center that can work at the same time to process a given operation.

- The default is 1
- This value displays as the default whenever you enter a standard operation, routing operation, or process operation for this work center
- The Mach/Op field affects scheduling of operations at this work center machine
  - During scheduling, the system uses the operation run time divided by the Mach/Op
- You can also use this field to indicate multiple operators on one machine

### *Setup Crew / Run Crew*

The number of people normally required to set up and run this work center.

- These fields are for reference only; they appear on some selected reports and inquiries
- No scheduling or cost calculations use this data

### *Machines*

The number of machines or people in this work center.

- The total capacity for a work center is:
  - The number of working hours times the number of machines
- If some of the machines in this work center can operate at the same time, you should enter that number in the Mach/Op field

## **Machine, Setup, and Labor Rates**

The values in these fields enter into item cost calculations and labor feedback functions to determine and post actual costs and variances.

These rates apply to all operations carried out at this work center and may not be changed for individual operations.

### *Mach Bdn Rate*

The burden rate per hour applicable to machine run time and setup at this work center.

- Standard machine burden cost at the operation is calculated as:  
(setup time / order quantity x routing machines per op + run time) x WC mach burden rate
- If yield is included in the standard cost, machine burden reflects the cumulative yield from all operations

### *Setup Rate*

The average hourly rate paid to set up this work center.

- If no setup labor is reported for an operation, the system assumes that standard setup was completed and not reported; setup is posted at standard during operation close or work order accounting close

- The setup portion of standard labor cost is calculated by multiplying the standard setup time by the setup rate
  - Setup time is the time it takes to set up all machines
  - Machines/operation is not considered here
- This cost is divided by the item order quantity
- Labor burden percentage is applied to the setup cost
- Actual setup cost is calculated by multiplying the actual setup time by the setup rate for the work center

### *Labor Rate*

The average rate paid per labor hour to run this work center.

- The run portion of standard labor cost is calculated by:
  - Multiplying the standard run time by the run rate
- Actual run cost is calculated by:
  - Multiplying the actual run time by the labor rate for the work center

### *Lbr Bdn Rate*

The labor burden rate per hour applicable to both setup and run time at this work center.


- The labor burden portion of standard burden cost is calculated using:
  - The labor burden rate and labor burden percentage
- The labor burden rate is multiplied by:
  - The operation setup and run times
- Actual labor burden is calculated using:
  - The actual hours reported and the burden rates and labor costs from the work center at which the operation was reported

### *Lbr Bdn%*


The labor burden percentage applicable to the total labor cost at this work center.

- The labor burden portion of standard burden cost is calculated using:
  - The labor burden rate and labor burden percentage

- The labor burden percentage is multiplied by:
  - The total labor cost for operation setup and run
- Actual labor burden is calculated using:
  - The actual hours reported and the burden rates and labor costs from the work center at which the operation was reported



## Work Centers and Routings Process Setup and Maintenance



- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ **Standard Operations (optional)**
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Standard Operations

Standard operations are optional.

- Often, routings share one or more operations that are essentially the same
  - An automated packaging process may be the same regardless of the color of the products packaged
  - Various heat treating or oven cycles are also examples of standard operations.
- To save work when entering new routing operations, in QAD Enterprise Applications, you can create template operation steps called standard operations

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## Standard Operations

Standard Operation: 1000  
 Description: Heat Treat cycle 1000  
 Work Center: PROTO  
 Machine: 1000  
 Setup Time: 0.2  
 Run Time: 3.5  
 Move Time: 0.0  
 Yield Percent: 100.00%  
 Tool Code:  
 Supplier:  
 Milestone Operation:   
 Inventory Value: 0.00  
 Subcontract Cost: 0.00  
 Subcontract LT: 0  
 Overlap Units: 0  
 Comments:

Templates for creating similar or identical operations within routings

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## Standard Operation Maintenance

A standard operation is a template for multiple similar or identical routing operations.

Be careful to create error-free templates; if not, you will be replicating errors.

- In Routing Maintenance or Work Order Routing Maintenance you can optionally specify a standard operation rather than enter it manually; this fills all the operation data with default values
- Each standard operation is defined with the setup, run, and move time (or subcontract time), yield, overlap, and instructions for carrying out this operation at its normal work center
  - This information displays as the default when a routing or process operation is added which references this standard operation code

- It may be changed, for example, if the operation should be performed by a different work center or machine; the operation times and instructions may also need to be changed

**Note** If you use standard operations as templates to save data entry then modify them, they are no longer “standard operations.” In the previous example Heat Treat cycle 1000 should always be the same.

- On a routing or work orders routing print, if there are no routing comments, standard operation comments print

Changes to standard operations do not automatically update routings previously created from those operations; use Routing Update to update selected routings.

[See in this training guide: \*Routing Update\* on page 74](#)

### *Standard Operation*

This code identifies a standard operation – a process operation common to several products or applicable to different routings in different operation sequences.

### *Description*

A description of this standard operation, usually indicating the type of operation such as “paint” or “stamp.”

The standard operation description prints on most reports beside the standard operation code.

### *Work Center*

The work center where this standard operation is normally performed.

### *Machine*

The machine this standard operation is normally performed on.

## Subcontract Considerations

You should set up either subcontract cost and lead time, or setup, run, and move time for an operation. If you record both sets of data, then cost and lead time are overstated and operation schedules are incorrect.

You can enter a supplier code even if the operation is not normally subcontract.

### *Setup Time*

The standard time, in decimal hours, it takes to prepare this work center to carry out this operation, independent of order quantity.

### *Run Time*

The time, in decimal hours, it normally takes to process one unit at this operation.

### *Move Time*

The time, in decimal hours, it normally takes to move work from this operation to the next, independent of order quantity.

- Since move time is often dependent on what the next operation is, this normally is changed on each routing or process operation
- Move time is not adjusted by the system to reflect differences in order quantity
  - It is stated in terms of the Order Quantity of the item, but may be changed manually on the work order
- In a process flow environment, move time is normally zero
- Move time applies to a physical movement of product that needs to be accounted for in the schedule
  - If product moves between buildings, time may be spent loading and unloading as well as in transit

### *Yield %*

The normal yield percentage for this operation – the percentage of any order expected to be in usable condition after this operation.

- The default is 100%

### *Tool Code*

A code identifying the tool normally used by this operation.

- Tool code may be left blank
- This field is for reference only and may appear on some selected reports and inquiries

### *Supplier*

The address code of the normal (or preferred) supplier for this subcontract operation.

- This field is for reference only and may appear on some selected reports and inquiries
- A supplier code may be recorded even if the operation is not normally subcontract
  - This is useful for identifying operations which may be subcontracted
  - Do not enter a subcontract cost or lead time
- If supplier address codes are changed using Address Code Change the change is not made here but must be done manually.

### *Milestone Operation*

Specifies whether you can report completions at this operation.

- Completions initiate a backflush for this and all previous non-milestone operations, back to but not including a previous milestone
- Milestone Operation is used only in the Repetitive module
- If this field = No, Repetitive Labor Transaction is not permitted. You can report in:
  - a Repetitive Setup Transaction,
  - b Repetitive Reject Transaction,
  - c Repetitive Rework Transaction, as well as in
  - d Repetitive Scrap Transaction which backflushes scrapped items.
- If this field = Yes, all transactions are allowed. Repetitive Labor Transaction backflushes material, labor, burden, and subcontract at standard
  - Report setup at non-milestones to avoid backflushing setup at standard
- The system assumes the last operation is a milestone, regardless of this field
- Milestones allow you to define meaningful reporting points in your processes and avoid reporting where it is not meaningful

- You may wish to report where the most labor or highest material costs are added, or where the product reaches a certain physical stage

### *Inventory Value*

Manually entered user-defined accumulated cost through this operation.

- Only used by the Repetitive WIP Cost Report
- Inventory Value might be used for “plugged” operation costs where these costs are set internally or negotiated with a customer, or for any cost you want to track in WIP, such as union costs, miscellaneous supplies, and so forth

### *Subcontract Cost*

The average cost per unit normally charged by subcontractors to perform this operation.

- It can be changed, based on the item and order quantity
- Cost calculations determine item costs using subcontract cost

### *Subcontract LT*

The average number of calendar days it normally takes a subcontractor to perform this operation.

- This value becomes the default when a routing or process operation is added which references this standard operation code
  - It can be changed, based on the item and order quantity
- Subcontract lead time is part of the calculation for the manufacturing lead time generated by Routing Cost Roll-Up
- Subcontract lead time influences scheduling for work order operations
- When scheduling work order operations, the system treats the subcontract lead time as the calendar days needed between the operation due date and the start date
  - For example, if subcontract lead time is two and the due date is the tenth of a month, the start date would be the seventh because the two days between (the eighth and the ninth) are needed for the subcontract LT

### *Overlap Units*


The number of units that must be completed at this operation before work can begin at the next operation.

- Operation overlap is considered by scheduling algorithms, usually with the effect of reducing overall manufacturing lead time: if the overlap quantity is 10, the system schedules only enough time to setup, run, wait, and move 10 items before starting the next operation
  - If the processing time at the next operation is longer than at the first, overall lead time is reduced
- If overlap is not used, you should set the overlap quantity to zero
- In a process flow industry, overlap quantity is normally 1


### *Comments*

Set this field to *Yes* to open the comments frame and attach comments to this standard operation.

- If you want to “freeze” current comments on specific work order routing operations, you can open the comment frame in Work Order Routing Maintenance
  - Changes to Master Comment Maintenance do not override the comments on existing work orders where you have frozen the comments
  - Once you have frozen the comments, you must delete them in Work Order Routing Maintenance if you want to access updated comments from another source, such as Master Comment Maintenance



## Work Centers and Routings Process Setup and Maintenance



- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ **Master Comments (optional)**
- ▲ Routing Setup
- ▲ Processes (optional)

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## Master Comments

You can maintain master comments as sets of templates that the routings then reference.

- These comments appear on the shop floor paperwork when the work order is released



## Master Comments

Text, such as instructions, that you can assign to operations

### Instructions:

1. Do this.
2. Do that.
3. Do both.
4. Do something else.

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Use master comments to aid in maintaining routings when detailed instructions are needed for some or all routing steps.

Comments are useful for recording such things as:

- Processing instructions
- Tolerances
- Test specifications for an operation

Standard operation comments may be accessed and changed on each routing operation, and these may be accessed and changed on each work order.

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## Master Comment Maintenance

Master Comment Maintenance x

Go To Actions Copy Print Preview

**Master Comments**

Master Reference: 10 Language:  
Type: Page: 1

Use storage tank t-20L, decant from filling machine into storage tank.  
Insure filling machine is empty. Insure tank is tightly caped before moving  
to inventory storage.


Access the comments using these key fields

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## Master Comment Maintenance

- Master Comment Maintenance stores up to 99 pages of free-form text, accessible by:
  - Reference code
  - Type
  - Language
  - Page number
- Use this program to create comments and procedures for your operations

**Note** This function may be called from within Routing Maintenance by operation.



## Work Centers and Routings Process Setup and Maintenance




- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Routings

Routings define the set of operations required to manufacture a product, with the work centers, machines used, the sequence of operations, the tools, the standard hours, and set up and run times.



# Routing

**A routing lists the work centers and operations for making a product**

- 1** Cut at work center **ABC**
- 2** Polish at work center **DEF**
- 3** Assemble at work center **GHI**

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## Example Routing

The operations in the routing can be custom made or can be standard operations.



## Routing Setup

- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Routing Setup

Routings are important and complex elements in QAD Enterprise Applications; the diagram shows the programs for their development and maintenance.



## Routing Setup

- ▲ **Routing Maintenance**
- ▲ Routing Copy
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Routing Maintenance



## Routing

### 2 ways to set up routings

- ▲ Routing Maintenance
- ▲ Routing Maintenance (Rate Based)

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### Types of Routing

- You have two ways to set up routings:
  - Routing Maintenance requests the time to produce one item
  - Routing Maintenance (Rate Based) requests how many items per hour

**Routing Maintenance**

Routing Code: 1100-00 Alloy Chain Crank, 160mm  
 Operation: 60 Start Date: End Date:

Standard Operation:  
 Work Center: PROTO CNC Finish Grinder  
 Machine: 1600  
 Description: Finish Grind to form

Machines per Operation: 1 Milestone Operation:

Overlap Units: 0 Subcontract LT: 0  
 Queue Time: 0.0 Setup Crew: 0.00  
 Wait Time: 0.0 Run Crew: 1.00

Setup Time: 0.1  
 Run Time: 0.1  
 Move Time: 0.0  
 Start Date:  End Date:   
 Yield Percent: 100.00%

Tool Code:  Supplier:   
 Inventory Value: 0.00 Subcontract Cost: 0.00  
 Comments:

How long per unit?

Click here to add comments

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## Routing Maintenance

Each routing or process consists of one or more operations.

### Field Definitions

Most of the fields contain default values from the work center or from standard operations. Here we cover only those fields unique to this screen.

#### *Routing Code*

This code usually matches the item number of the manufactured item, but it can be different for alternate routings or for similar routings or processes at different sites.

- When it is different, you attach the routing code to its product in Item Planning Maintenance or Item-Site Planning Maintenance

### *Operation*

Operation numbers identify steps within a specific routing code.

- Each routing or process includes a series of sequential steps
- Routing operations are accessed whenever a work order is created and printed
  - Operation information may be changed on any work order
  - To report labor, you must enter an operation number
- At least one operation is required to process repetitive labor feedback
- If you delete an operation from a routing, you must also close any outstanding cumulative orders using the routing in the repetitive module
  - This prevents reporting labor against the operation
- Operations should be numbered by 10's or 100's, so you can add new steps without renumbering existing operations
  - If you have operations 10, 20, and 30 and need to add another operation after operation 20, it can be entered as operation 25, for example

In a repetitive environment, this operation number is referenced in the product structure to show that the item is backflushed from that operation.

### *Start Date / End Date*

Routing steps can be defined as effective over a period of time. Starting and ending effective dates define that period. You enter the start date at the top of the screen and the end date at the bottom. These dates are inclusive and may not overlap.

- You can leave either or both fields blank
- Using effective dates enables you to phase in engineering changes and maintain history on-line
- Nonblank start and end dates determines when to include and when to exclude this step on the routing
- Functions that reference the routing always use the routing steps in effect on the current date
- Most reports and inquiries may be selected for a specific effective date

- To switch one step for another, add the new step and give it a start date in the future, then specify the end effective date for the existing step to the day before the new one is to take effect

#### *Standard Operation*

- You can enter a standard operation here when you create the routing, but after that time the field is protected and you cannot modify it

#### *Run Time*

This is the time required to manufacture one unit. Routing Maintenance (Rate Based) requests how many units can be produced per hour.

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## Routing Maintenance (Rate Based)

Routing Maintenance (Rate Ba... X

Go To Actions Copy Print Preview

Routing Code: 1100-00 Alloy Chain Crank, 160mm  
Operation: 60 Start Date: End Date:

Standard Operation:  
Work Center: PROTO CNC Finish Grinder  
Machine: 1600  
Description: Finish Grind to form

Machines per Operation: 1 Milestone Operation:

Overlap Units: 0 Subcontract LT: 0  
Queue Time: 0.0 Setup Crew: 0.00  
Wait Time: 0.0 Run Crew: 1.00

Setup Time: 0.1 Tool Code:

**Hourly Production Rate: 10.0** Supplier:

Move Time: 0.0 Inventory Value: 0.00  
Start Date:  Subcontract Cost: 0.00  
End Date:  Comments:

Yield Percent: 100.00%

How many units per hour?

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## Routing Maintenance (Rate Based)

Use this program to create routings with run time expressed in units per hour.

- This is the only difference between the two programs



## Routing Setup

- ▲ Routing Maintenance
- ▲ **Routing Copy**
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Routing Copy

With this program you can create a new routing by copying another one.

- This is useful when items share similar operations or when creating alternates

Routing Copy x

Go To Actions Copy Print Preview

Source Routing Code: 2400-00 Chain Lube Formula

Operation: To:

Destination Routing Code: 2400-10

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## Routing Copy

### *Source Routing Code*

The routing you wish to copy.

### *Operation / To*

You can specify a range of operations or leave these fields blank to copy all operations.

### *Destination Routing Code*

The routing or process code you are creating.

- The destination routing or process does not have to be a valid item number

**Note** This feature should be password-protected.



## Routing Setup

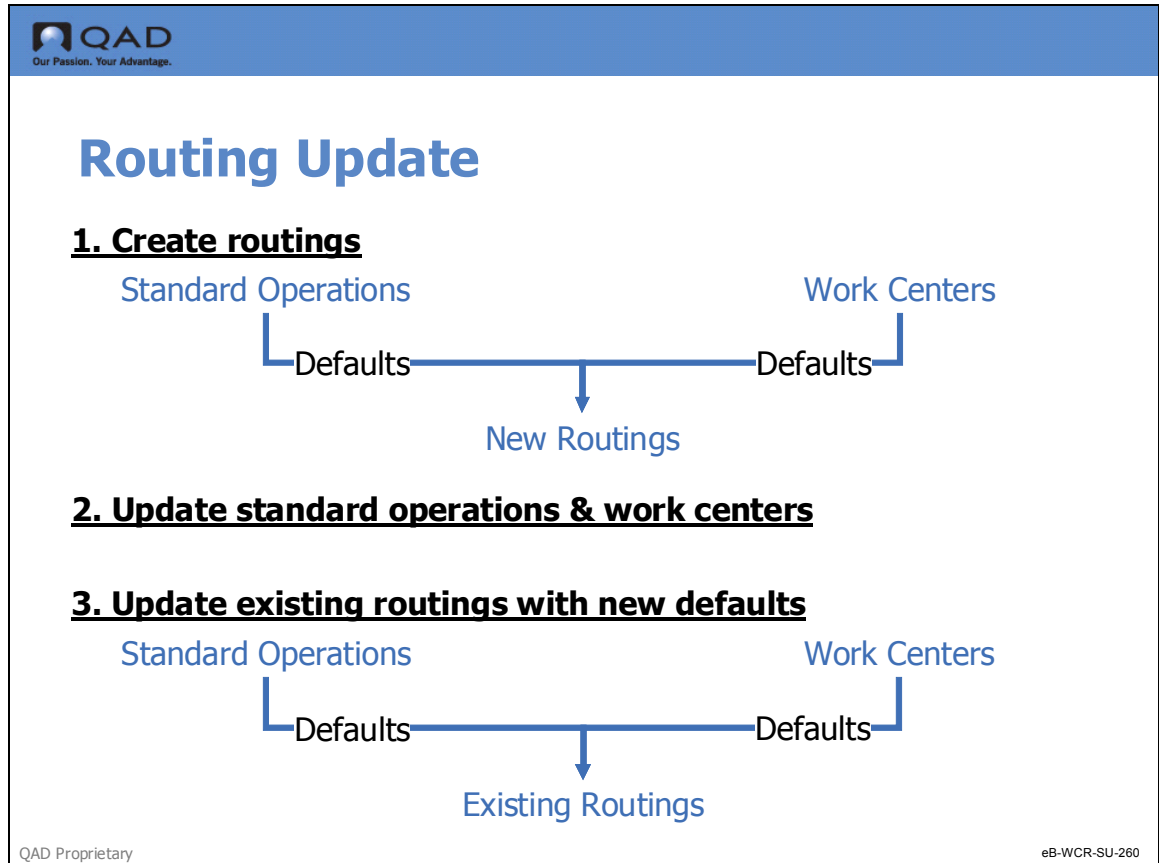
- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ **Routing Update**
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Routing Update

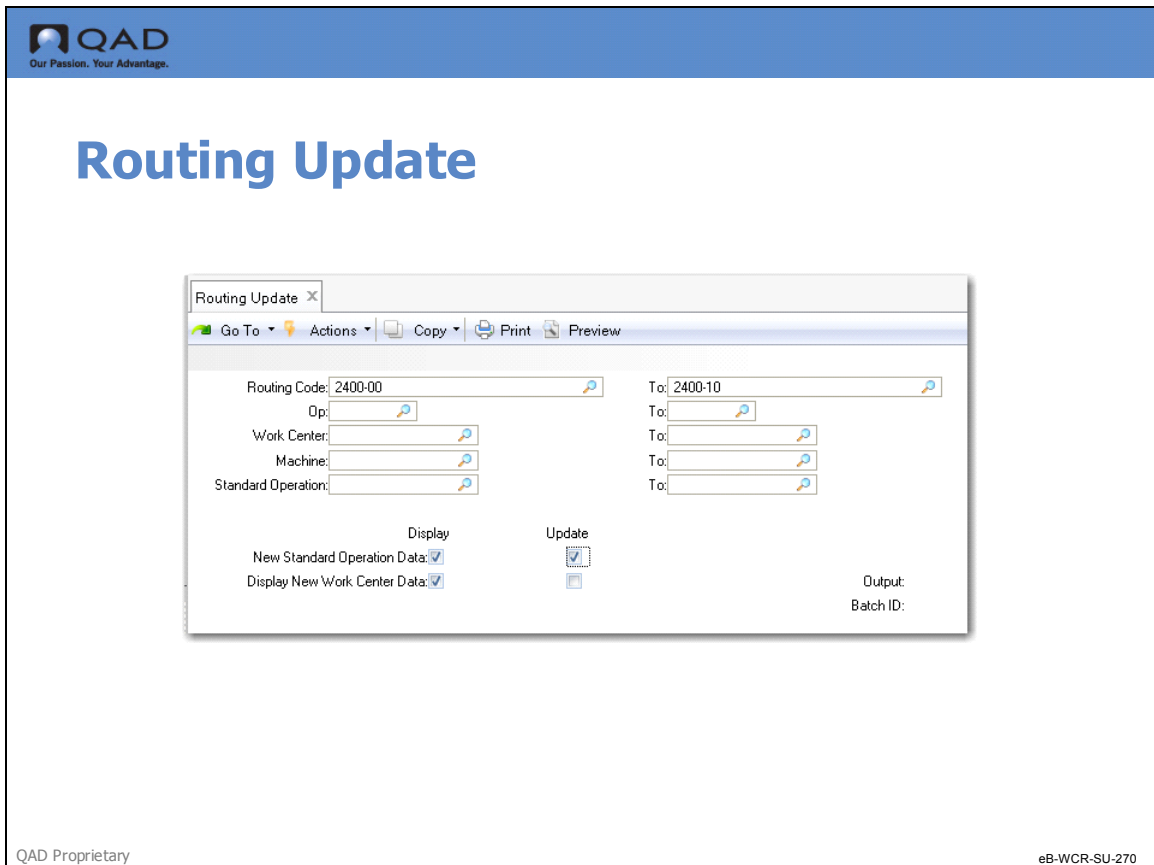
This update can help you maintain existing routings when standards change; it updates all or a range of routing and work center data.



This program updates existing routings with any new default data from standard operations and work centers.

- Run it only if standard operations or work center standards change
- For example: the standard time and temperature for a heat treat cycle are changed by engineer order. The standard operation heat treat cycle is used by hundreds of items. Update the Standard Operation record then run this Update transaction. All routes using this standard operation are updated to the new time and temperatures.

**Note** This update overrides any changes made to routings that use the default information. This feature should be password-protected.



## Routing Update Criteria

*Routing Code / Op / Work Center / Machine / Standard Operation*

Use these selection criteria to limit the routings to update.

- The program produces a report
- By specifying No to update, you can produce a report without updating; use this to verify what you are doing, then update

*Display / Update*

*New Standard Operation Data / New Work Center Data*

Use these fields to control the function.

- The report produced by this function compares the operation information to the standards and prints an asterisk whenever they don't match
- Set *Display* to *Yes* to include the information on the report
- To review only, set *Display* = *Yes* and *Update* = *No*
  - After going over the report, you can set *Update* to *Yes* and rerun to make the changes take effect



## Routing Setup

- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ Routing Update
- ▲ **Routing Cost Roll-Up**
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Routing Cost Roll-Up

Each routing or process describes the steps required to make this item, including where performed (Work Center), how long (Queue Time, Setup Time, Run Time, Wait Time, and Move Time), and the expected Yield% at each operation.

- Cost roll-ups use this information to calculate the manufacturing costs, lead times, and total yield for the item

**Note** Normally this function uses the current or simulated cost set.

Discussed in the following Training Guide: Product Costing and Cost Management





## Routing Cost Roll-Up

Calculate the manufacturing costs, lead times, and yield for selected items

- ▲ Labor Time
- ▲ Setup Time
- ▲ Lead Time
- ▲ Yield
- ▲ Labor cost
- ▲ Burden cost
- ▲ Subcontract cost

These are the elements used in calculating costs, yields, and lead times.

Routing Cost Roll-Up X

Go To Actions Copy Print Preview

Site: PROTO QMS-PR Prototype Prod.  
 Cost Set: Current Default Current Cost Set [AVG / CJRR]

Item Number: To:

Item Type:  
 As of Date: 1/12/2009

Roll-up Labor Time:   
 Roll-up Setup Time:   
 Roll-up Lead Time:   
 Roll-up Item Yield:  Include Yield in Cost:

Roll-up Labor Cost:   
 Roll-up Burden Cost:   
 Roll-up Subcontract Cost:   
 Update Items without Routings:   
 Update Items At This Site Only:

Output:  
 Batch ID:

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## Routing Cost Roll-Up

This function calculates this-level costs. Be aware that this may take some time to process.

**Note** You should always run this function before Product Structure Cost Roll-Up when establishing standard costs.



## Routing Setup

- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ **Operation Cost Calculation**
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Operation Cost Calculation

Operation Cost Calculation does a combined routing and product structure roll-up, creating a separate operation cost file broken down by cost categories—material, labor, burden, and subcontract—and totaled by operation and routing code.

- This calculation does not have a direct GL effect



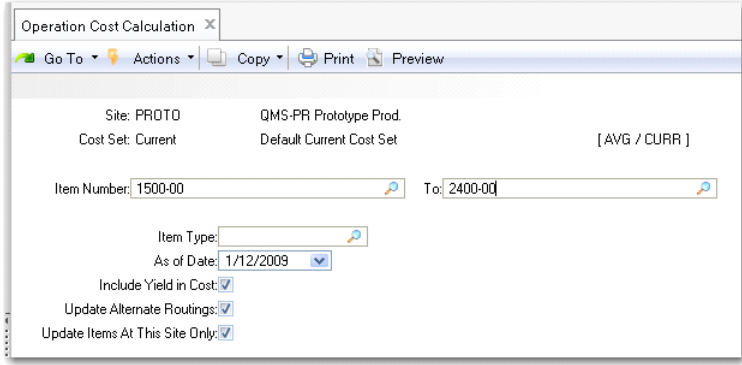
## Operation Cost Calculation

A combined routing and product structure roll-up, with a breakdown by cost categories (material, labor, burden, subcontract) and totaled by operation and routing code

### Assign components to operations in

- ▲ Product Structure Maintenance or
- ▲ Formula Maintenance (shown)

Scrap: 0.00%  
Lead Time Offset:  
Operation: 10



The screenshot shows the 'Operation Cost Calculation' window in QAD. The window title is 'Operation Cost Calculation'. The menu bar includes 'Go To', 'Actions', 'Copy', 'Print', and 'Preview'. The main area displays the following information:

- Site: PROTO      QMS-PR Prototype Prod.
- Cost Set: Current      Default Current Cost Set      [AVG / CURR]
- Item Number: 1500-00      To: 2400-00
- Item Type: [Empty]
- As of Date: 1/12/2009
- Include Yield in Cost:
- Update Alternate Routings:
- Update Items At This Site Only:

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## Operation Cost Calculation

- This calculation does not affect item costs
- Operation Cost Calculation relies on accurate item costs, routings and bills
- The resulting operation costs are used by:
  - Repetitive Scrap Transaction to value scrapped items
  - Repetitive WIP Cost Report to value WIP



## Routing Setup

- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ **Actual Pay Rate Maintenance**
- ▲ Alternate Routings
- ▲ Work Center/Routing Standards

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## Actual Pay Rate Maintenance

- You can, optionally, enter pay rates in this program for use in work cost calculations
- You can also use it to calculate labor rate variance



# Actual Pay Rate Maintenance

**Use this program to enter employee pay rates**

This way, when you report labor against a work order or repetitive schedule, the program uses the employee's actual rate rather than the standard rate from the work center

**Work Center Maintenance**

Set Rate:	25.00
Labor Rate:	15.00
Labor Burden Rate:	5.00
Labor Bdn %:	25.00%

**Actual Pay Rate Maintenance**

Pay Type:	HR
Rate of Pay:	24.50
Prior Pay Rate:	20.25



# Actual Pay Rate Maintenance

Actual Pay Rate Maintenance

Go To Actions Copy Print Preview

Employee: EM100  
Name: Marie Sanchez  
Job Title: Senior Assembler  
Department: PROTO

Pay Type: HR Shift: 1  
Rate of Pay: 24.50 Normal Hrs/Units: 8.00  
Prior Pay Rate: 20.25 Date of Last Pay Rate: [dropdown]

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## Actual Pay Rate Maintenance

The rates you enter here are used by labor reporting programs such as Labor Feedback by Work Order and Repetitive Labor Transaction to calculate variances.





## Routing Setup

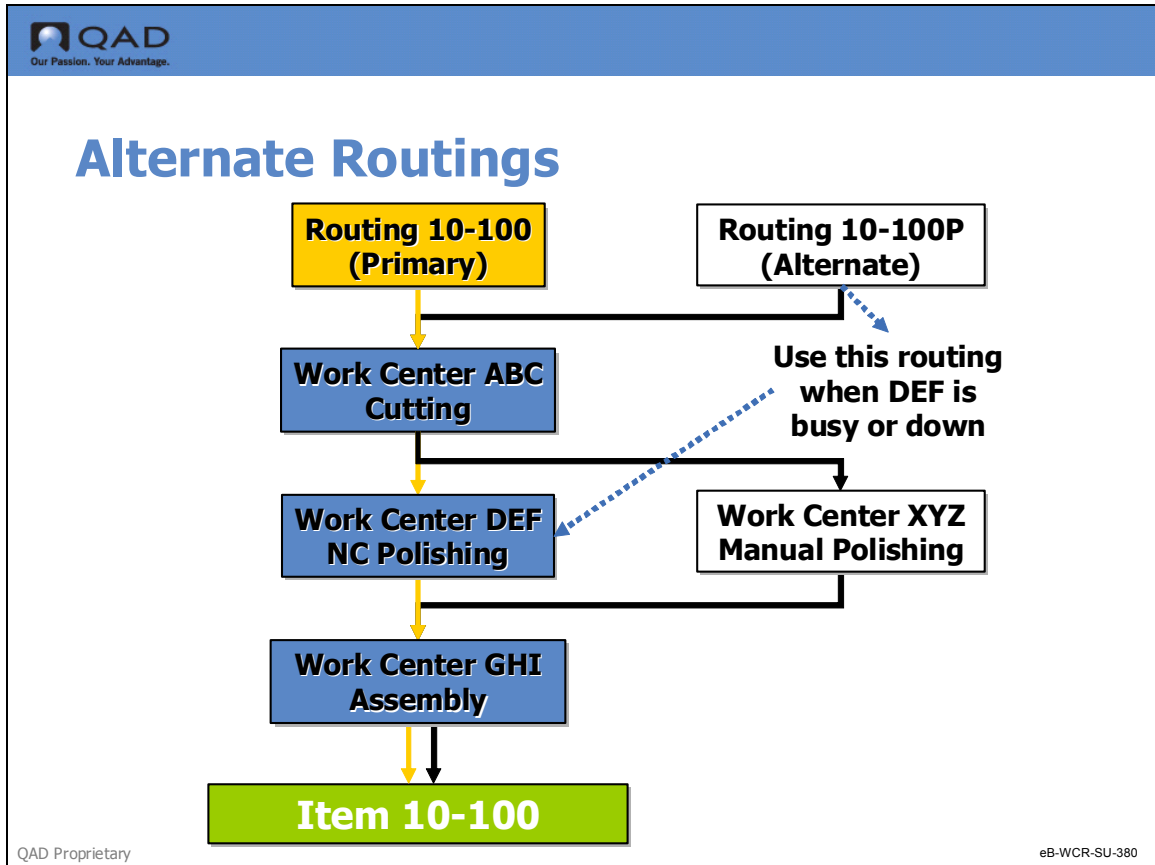
- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ **Alternate Routings**
- ▲ Work Center/Routing Standards

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## Alternate Routings

One item can be made different ways, using different operations, work centers, machines, and perhaps different components. Each of these is called an alternate.



One of the more common uses of an alternate route is in the case of an alternate product structure. Often the use of alternate components or materials will require the use of alternate operations. Other uses include alternate workcenters and or machines which may require more time, or the use of subcontract operations deal with capacity issues.

An alternate route may also be used as a set of default operations. For example in cutting slacks of a specific size the route does not care what color the material is or often what type of material is being cut.

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## Alternate Routings

- 1 Create the alternate in Routing Maintenance then...**
- 2 Assign items to it in Alternate Routing Maintenance** (Field data shown for example only)
- 3 Use Work Order Maintenance or the Shop Floor Control module to assign the alternate to a specific work order**

**Routing 10-100P  
(Alternate)**

Alternate Routing Maintenance

Go To Actions Copy Print Preview

Item Number: 1500-10	Site: PROTO
Description: Chain Lube, 100ml	Drawing:
Unit of Measure: EA	Item Type:
	Status: Proto
Routing Code: 1500-10-A1	
Bill of Material: 1500-10-A1	

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## Alternate Routings: Procedure

Often, routings are named the same as the items they produce.

Alternate routings have a name that does not match any item. You assign items to the routing in Alternate Routing Maintenance, then actually use them in Work Order Maintenance or Shop Floor Control to override the item's usual routing with the alternate. An alternate route may also be assigned as a default for an item in Item Planning Maintenance or Item Site Planning Maintenance.

Discussed in the following Training Guide: Shop Floor Control

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Routing Maintenance
X

Go To Actions Copy Print Preview

Routing Code: 1500-10-A1

Operation: 10                      Start Date:                      End Date:

Standard Operation:

Work Center: Proto                      Prototype Production

Machine: \_\_\_\_\_

Description: \_\_\_\_\_

Machines per Operation:                       Milestone Operation:

Overlap Units:                       Subcontract LT:

Queue Time:                       Setup Crew:

Wait Time:                       Run Crew:

Setup Time:                       Tool Code:

Run Time:                       Supplier:

Move Time:                       Inventory Value:

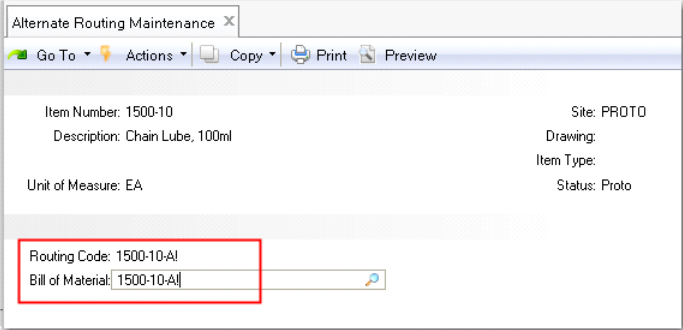
Start Date:

End Date:

Subcontract Cost:

Yield Percent:                       Comments:

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## Alternate Routing Maintenance

In this function, you assign items to the alternate routings created in Routing Maintenance or Process Definition Maintenance.

- MRP and manufacturing orders always use the standard Routing Code and BOM/Formula associated with the item in Item Planning Maintenance or Item-Site Planning Maintenance as do the costing functions
  - You can manually override the Routing Code and BOM/Formula on any work order to specify the use of any approved alternate
  - If an alternate routing is chosen, the appropriate product structure or process is automatically attached

### *Item Number*

The item number this alternate routing or process relates to.

- The item code may not be a base process (an item with a Co-Product/By-Product structure)

### *Site*

The site that uses this alternate routing or process.

- The same alternates may be associated with more than one site

### *Routing Code*

A code identifying the routing or process which may be used as an alternate method for producing this item/product.

- Only predefined alternate routings or processes may be referenced on manufacturing orders for this item at this site

### *Bill of Material*

A code identifying the product structure or formula (bill of material) which is used when this alternate routing is used to produce this product.

- When this alternate routing is selected for use on a manufacturing order, the system automatically selects this alternate bill
- If this field is left blank, the default is the standard bill associated with the item



## Routing Setup

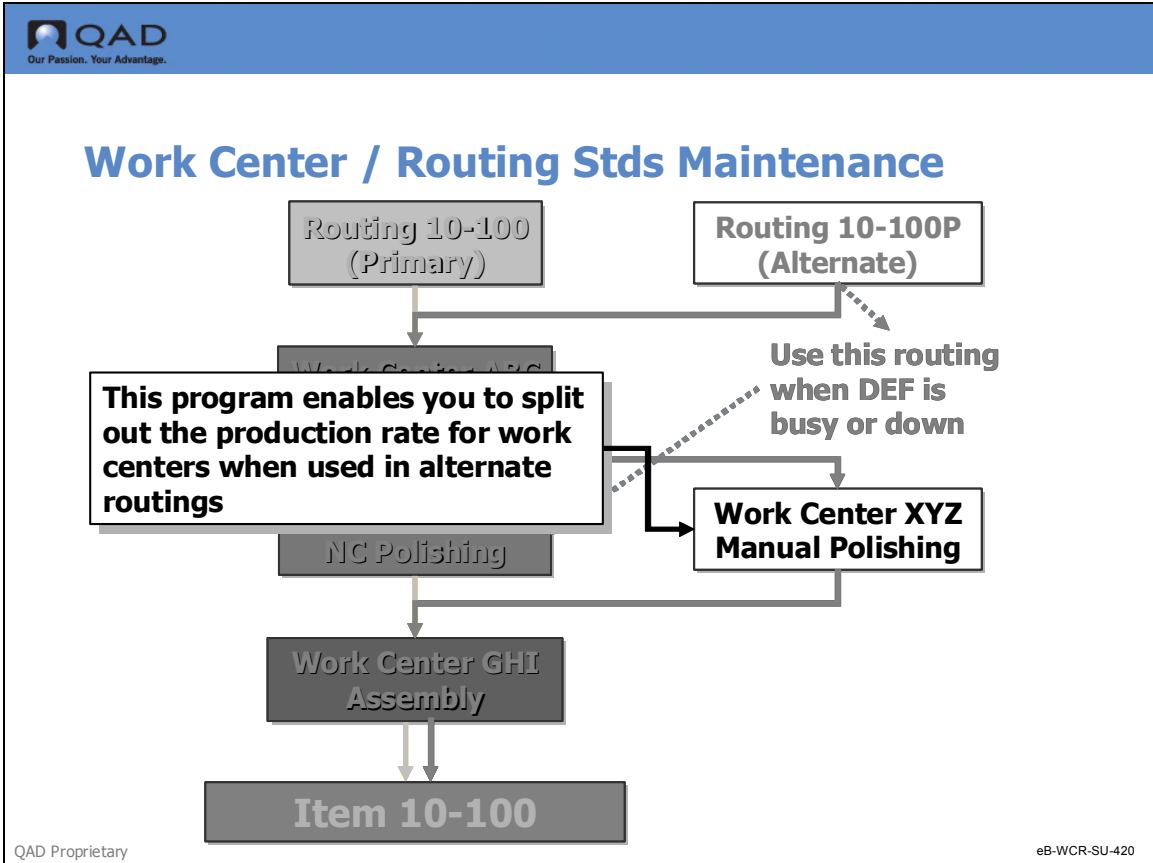
- ▲ Routing Maintenance
- ▲ Routing Copy
- ▲ Routing Update
- ▲ Routing Cost Roll-Up
- ▲ Operation Cost Calculation
- ▲ Actual Pay Rate Maintenance
- ▲ Alternate Routings
- ▲ **Work Center/Routing Standards**

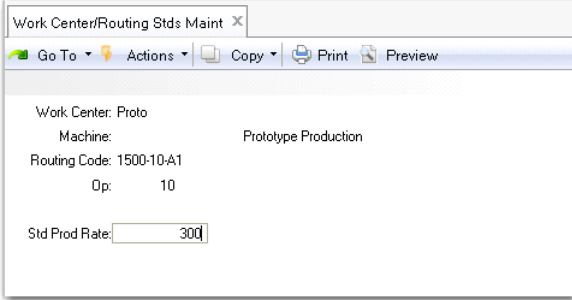
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## Work Center/Routing Standards

- Routings and process definitions identify the work center where each operation is *normally* performed, but the work can be done at several work centers
  - Work Center/Routing Stds Maint enables you to establish different production rates for the various alternates and items manufactured in them
  - This cross reference is used for repetitive module efficiency reports only





The screenshot shows a software window titled "Work Center/Routings Std Maint". The window has a menu bar with "Go To", "Actions", "Copy", "Print", and "Preview". The main content area displays the following information:

Work Center:	Proto
Machine:	Prototype Production
Routing Code:	1500-10-A1
Op:	10
Std Prod Rate:	<input type="text" value="300"/>

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## Work Center/Routing Std Maint

Standard rates can be reviewed when determining which Work Center to use. Later, after production reporting, efficiency reports use the Std Prod Rate defined for the Work Center where the work was actually done rather than the standard rate for the Work Center identified on the routing.

- Standard production rates are used only in Repetitive 18, not Shop Floor Control 17

### *Work Center / Machine*

The alternate work center and machine for this routing code and operation.

- The work center code and the machine code together identify a work center – a basic production unit used in manufacturing planning and control
- Work centers identify individual machines, groups of similar machines, or subcontract suppliers

### *Routing Code*

The routing code this standard run rate applies to.


### *Op*

The operation number this standard run rate applies to. Each operation step is uniquely identified by a routing code and operation number.


### *Std Prod Rate*

The standard production rate for this routing operation when it is processed on this work center and machine.

- Production rate is expressed as the number of units per hour that can be processed (excluding setup time)
  - The unit is the item/product unit of measure



## Work Centers and Routings Process Setup and Maintenance



- ▲ Shop Calendar
- ▲ Departments
- ▲ Work Centers
- ▲ Standard Operations (optional)
- ▲ Master Comments (optional)
- ▲ Routing Setup
- ▲ Processes (optional)

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## Processes

- A process is, like a routing, a systematic sequence of steps producing a specified result
- Processes add value by mixing, separating, forming, and/or using chemical reactions; they may be done in either batch or continuous mode



## Process Setup and Maintenance

- ▲ **Process Definition**
- ▲ Process Definition Copy
- ▲ Process/Formula Maintenance

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### Process Definition

You set up processes as you do routings.

**Process Definition Maintenance**

Routing Code: 2400-00      Lube Formula

Operation: 10      Batch Quantity: 20,000.0 ml

Start Date:      End Date:

Standard Operation:

Work Center: Proto      Prototype Production

Machine:

Description: Put components in Mixer

Machines per Operation: 1      Milestone Operation:

Overlap Units: 0      Subcontract LT: 0

Queue Time: 0.0      Setup Crew: 0.00

Wait Time: 0.0      Run Crew: 1.00

Setup Time: 0.083

Run Time/Batch Qty: 0.0

Move Time: 0.0

Start Date:

End Date:

Yield Percent: 100.00%

Tool Code:

Supplier:

Subcontract Cost: 0.00

Comments:

Unique fields

Set up in Formula Code Maintenance OR Batch Quantity Change

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## Process Definition Maintenance

The fields in this screen correspond to those in Routing Maintenance.

### *Run Time/Batch Qty*

The time it normally takes to process one batch at this operation.

- Run time is stated in decimal hours
- Run times are used to calculate item/product cost and lead time, and by planning to schedule operations
- Process operation run times are always entered in terms of the batch quantity for the item/product

- Make sure you set this first using Batch Quantity Change because the system uses this to calculate the run time per unit and stores this value along with the batch quantity
- When the Batch Quantity Change function is run, runtime per batch is automatically recalculated based on the new batch quantity and the new batch quantity is recorded
- Before setting up the process, you can use Formula Code Maintenance to define batch quantity, but afterwards, you must use Batch Quantity Change

### *Setup Time*

- The standard time, in decimal hours, it takes to prepare this work center to carry out this operation, independent of quantity

### *Run Time/Batch Quantity*

- The time, in decimal hours, it normally takes to process one batch at this operation
- Run times are used to calculate item/product cost and lead time, and by planning to schedule operations

**Note** QAD Enterprise Applications treats setup time as fixed and run time as variable.

In process industries, the reverse may be true, as in heating a product to a specified temperature; the heating time can vary depending on quantity, but the dwell time remains the same.

In this case, you can create one operation with a setup time of zero and the run time set to gallons times the time required for heating, and a second operation with setup time set to equal the dwell time, and run time set to zero.



## Process Setup and Maintenance


- ▲ Process Definition
- ▲ **Process Definition Copy**
- ▲ Process/Formula Maintenance

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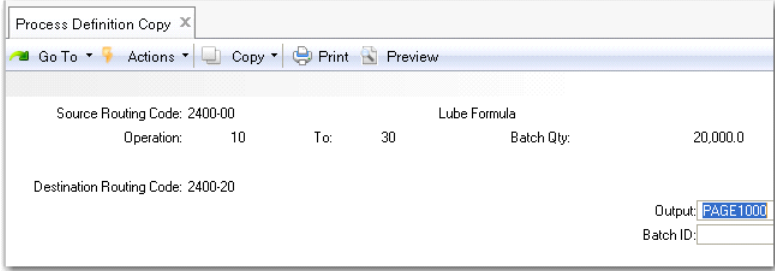
eB-WCR-SU-470

### Process Definition Copy

Process Definition Copy creates a new process definition by copying another one—useful when items share similar operations or when creating alternates.


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## Process Definition Copy



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### Process Definition Copy

#### *Source Routing Code*

The routing code from which operations are to be copied.

#### *Operation / To*

Select a range of operations to copy.

- Leaving these fields blank copies all operations

#### *Destination Routing Code*

The routing code into which selected operations are copied.



## Process Setup and Maintenance

- ▲ Process Definition
- ▲ Process Definition Copy
- ▲ **Process/Formula Maintenance**

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### Process/Formula Maintenance

Process/Formula Maintenance allows you to enter formula, batch, and process information by operation. It is common in the process industry to have process sheets which define both the steps of the process and the materials which are used at each step in a single document. This function allows you to do the same thing.

Process/Formula Maintenance X

Go To Actions Copy Print Preview

**Formula**

BOM/Formula Code: 2400-00 Batch Size: 20,000.0 UM: ml  
 Description: Lube Formula Formula:   
 Backflush Method: 1 Quantity Complete Method: SUM

**Entry Options**

Operation Detail:  Co/By-Products:   
 Components:  Comments:

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## Formula/BOM Code Screen

*BOM/Formula Code / Description*

Enter the code and description.

*Formula*

Indicates whether this is a formula or a product structure.

- *Yes* - This is a formula
  - Normally only BOM codes flagged as formulas are listed on Formula reports and inquiries

- *No* - This is a product structure, normally used in Product Structure functions or as a base process for Co-Products/By-Products

### ***Backflush Method***

Provides the calculation basis to backflush components of the base process based on the received quantities of the Co-Products/By-Products.

- Value can be 1 or 2
- *Backflush Method 1*: The backflush (base process) quantity is calculated from the receipt quantities processed for all of the Co-Products/By-Products

This method calculates the backflush quantity based on the following:

- Quantities received for each of the Co-Products/By-Products
- Unit-of-measure conversion factors to convert Co-Product/By-Product quantities into base process units

Use method 1 when the quantity for a batch is directly related to the sum of its output

For example, for a process that sorts fruit into different sizes and grades, the batch quantity can be calculated from the total amount of fruit processed for all sizes and grades

This method is generally appropriate when there is greater variability in the output percentages for the various products

- *Backflush Method 2*: The default backflush quantity is the order quantity for the base process work order

You can change the backflush quantity to reflect the actual quantity processed for a batch

Use method 2 when the batch quantity is closely related to the expected output of a particular co-product

- For example, for a process that makes ice cream, the batch quantity can be calculated from the amount of ice cream processed

Any by-products, such as waste water, would not be necessary for the calculation of the batch quantity

### ***Operation Detail / Components / Co/By Products / Comments***

You determine which screens to display by entering *yes* or *no*.

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## Process/Formula Maintenance

Process/Formula Maintenance X

Go To Actions Copy Print Preview

**Operation Detail**

Operation: 10 Start Date: End Date:

Standard Operation:

Work Center: Proto Prototype Production

Machine:

Description: Put components in Mixer

Machines per Operation: 1 Milestone Operation:

Overlap Units: 0 Subcontract LT: 0

Queue Time: 0.0 Setup Crew: 0.00

Wait Time: 0.0 Run Crew: 1.00

Setup Time: 0.083 Yield Percent: 100.00%

Run Time/Batch Qty: 0.0 Tool Code:

Move Time: 0.0 Supplier:

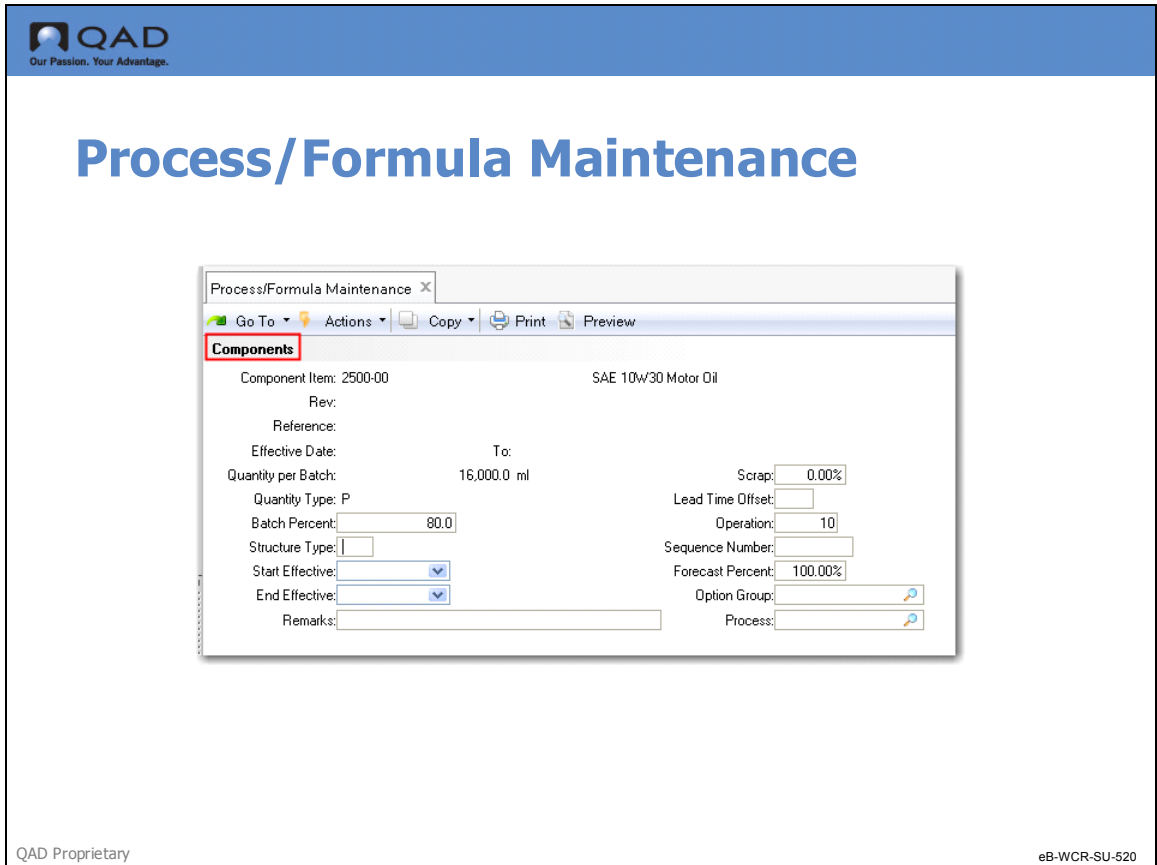
Start Date: Subcontract Cost: 0.00

End Date: Comments:  UM:

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### Operation Detail Screen

- The Process Operation Detail records information about the operations associated with the formula's process definition; it is the same as Process Definition Maintenance



### Components Screen

- The Formula Components screen records information about the components used at each operation; it is the same as Formula Maintenance.

Discussed in the following Training Guide: Product Structures and Formulas

## Exercise: Routings and Work Centers

Description: In this exercise, you define work centers and routing steps for forging cranks.

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

- 1 Use Department Browse 14.2 to review the departments. The crank will be assigned to department Proto.
  
- 2 Use Work Center Maintenance 14.5 to create two machines in the work center PROTO. Enter the following information:

Work Center:	PROTO
Machine:	1000
Description:	Forge Oven
Department	PROTO
Queue Time:	0
Wait Time:	0
Mach/Op:	1
Setup Crew:	0
Run Crew:	1
Machines:	1
Mach Bdn Rate:	100
Setup Rate:	25.00
Labor Rate:	25.00
Lbr Bdn Rate:	0.00
Lbr Bdn%:	200

Work Center:	PROTO
Machine:	1100
Description:	Forge Press
Department	PROTO
Queue Time:	0
Wait Time:	0
Mach/Op:	1
Setup Crew:	0
Run Crew:	1
Machines:	1
Mach Bdn Rate:	100
Setup Rate:	25.00
Labor Rate:	25.00
Lbr Bdn Rate:	0.00
Lbr Bdn%:	200

- 3 Most companies have some that vary little from product to product. For example, QMS PR have established a heat treat cycle that can be used for most drop forged parts.

Use Standard Operation Maintenance 14.9 to enter standard operation data listed below:

Standard Operation:	1000
Description:	Heat treat cycle 1 450c-2.5hr
Work Center:	PROTO
Machine:	1000
Run Time:	.005

(Leave the other fields as they are.)

**Note** In this example the queue time is the time for the oven to come up to temp. The wait time is the actual oven cycle time.

4 Use Routing Maintenance 14.13.1 to create a route for item 1100-00 Alloy Crank

Routing Code: 1100-00  
Operation: 10  
Standard Operation: 1000  
Queue Time: .75  
Wait : 2.5

Notice that you don't have to enter any of the other information. All of the data fields were completed from the standard operation you referenced.

Comments could be used here to add additional detail about the heat treat process. Check the comments box and when the window opens add the following comment:

“When the heat treat cycle is complete; ensure the forge press is available and setup with the correct die. Using tongs, move the billet to the forge press as quickly as possible.”

5 Add a second operation for the 1100-00

Operation : 20  
Work Center : PROTO [this field should auto-fill]  
Machine : 1100  
Description : Forge crankr  
Queue Time: 0.0  
Wait : 0.0  
Setup : 0.25  
Run Time : .017

6 Using Routing Browse/Inquiry 14.13.3, review the resulting operation for the alloy crank 1100-00.

7 Use Calendar Maintenance 36.2.5 to setup a calendar for Site PROTO, Work center PROTO and Machine 1000, forge Oven. This machine is available 24 hours a day Monday through Friday.

- 8** In a pinch filling of the 1500-10 chain lube bottle can be done in the repair work center in the Test department. However the task takes longer and the work center costs are different.  
Use Routing Copy 14.13.6 to create an alternate route for the 1500-10 chain lube product.  
Copy the route for 1500-10 to destination code 150010-A1.
- 9** Use Routing Maintenance 14.13.1 to change the work center for operation 10 from Proto to Repair  
Operation 10 now has no machine and the setup is still 0.25 but the run time is 0.1 the description is fill with funnel.  
Delete operation 20, Operation 30 is unchanged except for the work center
- 10** Use Alternate Routing Maintenance 14.15.1 to link item 1500-10 to Routing Code 1500-10-A1.
- 11** Use Routing Inquiry 14.13.3 to review the new alternate route.
- 12** Use Alternate Route Browse 14.15.2 to see all the routes for item 1500-10.



## Course Overview

- ✓ Introduction to work centers and routings
- ✓ Business considerations
- ✓ Set up the shop calendar, departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Application
- ▲ Process subcontract operations in QAD Enterprise Application

CHAPTER 4

# **Work Order Subcontract Processing**



## Process Subcontract Operations

### In this section you learn how to:

- ▲ Identify some key business considerations before setting up work centers, routings, and WO subcontracting in QAD Enterprise Applications
- ▲ Set up departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
- ▲ **Process subcontract operations in QAD Enterprise Applications**

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This lesson covers subcontract setup and processing with work orders. Advanced Repetitive Schedules offer significant additional functionality for subcontract operations. Advanced Repetitive subcontract operations are covered in the Advanced Repetitive course.

**Note** The department and work center setup for subcontract operations covered here also applies to the advanced repetitive functionality.



## Subcontracting Requirements

- ▲ **Department for outside operations**
- ▲ Work centers for outside operations
- ▲ Subcontract routing operations

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### Subcontracting Requirements – Department

- Subcontract processing requires work in both manufacturing and purchasing
- In this subsection, you look at the control information to enter in the manufacturing module

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## Department Maintenance: Subcontracting Requirements

Department Maintenance x

Go To Actions Copy Print Preview

Department: 99

Default Sub-Account:  Override

Default Cost Center:  Override

Description: Subcontract Dept

Labor Capacity: 0

Cost of Production:	5770	Cons	
Labor:	5100	Cons	
Burden:	5200	Cons	
Labor Usage Variance Acct:	5140	Cons	Mfg
Labor Rate Variance Acct:	5150	Cons	Mfg
Burden Usage Variance:	5240	Cons	Mfg
Burden Rate Variance:	5250	Cons	Mfg

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### Department Maintenance: Subcontract

- You must create at least one department before entering any work centers or routings
  - You should set up a department to group subcontract work centers
  - This department record has no accounting effect



## Subcontracting Requirements

- ▲ Department for outside operations
- ▲ **Work centers for outside operations**
- ▲ Subcontract routing operations

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## Subcontracting Requirements – Work Centers

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## Work Center Maintenance: Subcontracting Requirements

Work Center Maintenance

Go To Actions Copy Print Preview

Work Center: SU100 Machine:

Description: Subcontract vendor

Department: 99

Queue Time: 0.000

Wait Time: 0.0

Mach/Op: 1

Setup Crew: 0.00

Run Crew: 1.000

Machines: 1.000

Mach Bdn Rate: 0.00

Setup Rate: 0.00

Labor Rate: 0.00

Labor Burden Rate: 0.00

Labor Bdn %: 0.00%

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### Work Center Maintenance: Subcontract

A work center is a production area with one or more people or machines having identical capabilities.

For subcontracting, set up a work center for each type of subcontract operation or supplier, leaving costs at zero. It will be most convenient if there is one work center for each subcontract vendor and the work center code is equal to the supplier code. In the example shown here the supplier code is SU100 and the Work Center code is SU100.



## Subcontracting Requirements

- ▲ Department for outside operations
- ▲ Work centers for outside operations
- ▲ **Subcontract routing operations**

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## Subcontracting Requirements – Routing

Certain fields in routing operations deal specifically with subcontract requirements.

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## Routing Maintenance Subcontracting Requirements

Routing Code: 1000-00      Roller Bearing Hub Assem  
Operation: 40      Start Date:      End Date:

Standard Operation:  
Work Center: SU100      Subcontract Vendor

Machine:  
Description: Hot Stamp logo on Hub

Machines per Operation: 1      Milestone Operation:

Overlap Units: 0      Subcontract LT: 3

Queue Time: 0.0      Setup Crew: 0.00

Wait Time: 0.0      Run Crew: 1.00

Setup Time: 0.0      Tool Code:

Run Time: 0.0      Supplier: SU100

Move Time: 0.0      Inventory Value: 0.00

Start Date:

End Date:

Yield Percent: 100.00%      Subcontract Cost: 2.50

Comments:

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### Routing Maintenance - Subcontract

- Enter subcontract cost and lead time for subcontract operations
  - These values are the default when a routing or process operation is added which references this standard operation code
- Subcontract lead time is part of the calculation for the manufacturing lead time of an item (performed in Routing Cost Roll-Up), and influences scheduling for work order operations
- Subcontract cost is the average cost per unit normally charged by subcontractors to perform this operation
  - Cost calculations determine item costs using subcontract cost
- The Supplier field is informational only; you can enter a supplier code even if the operation is not normally subcontracted. This code appears on the work order routing document

You should enter either:

- Subcontract cost and lead time, or
- Setup, run, and move time

**Warning** If you enter both sets of data, cost and lead time are overstated and operation schedules are incorrect.

Routing Maintenance X

Go To Actions Copy Print Preview

Routing Code: 1000-00 Roller Bearing Hub Assem  
 Operation: 40 Start Date: End Date:

Standard Operation:  
 Work Center: SU100 Subcontract Vendor  
 Machine:  
 Description: Hot Stamp logo on Hub

Machines per Operation: 1 Milestone Operation:   
 Overlap Units: 0 Subcontract LT: 3  
 Queue Time: 0.0 Setup Crew: 0.00  
 Wait Time: 0.0 Run Crew: 1.00

Setup Time: 0.0 Tool Code:  
 Run Time: 0.0 0.0 Supplier: SU100  
 Move Time: 0.0 Inventory Value: 0.00  
 2.50

WIP Item: Hot Stamp Move Next Operation:   
 Auto Labor Report:

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This second frame appears for entry of subcontracting information.

### WIP Item

- An item number to represent Work-In-Process (WIP) material for subcontract shipments for example you might create a WIP Item "Hot Stamp" to accommodate a large range of items that are sent outside for processing.
- This gives you accountability and costing for items currently at the supplier's place of business
  - This must be a valid item number from the master file
- This field is used by Sub Shipper Print in Advanced Repetitive Subcontract processing
- The item number entered here is used to get a description and unit weight from Item Master Maintenance, used for printing in the subcontract shipper

### *Move Next Op*

- This field is used as the default for the field of the same name in Advanced Repetitive in both Backflush Transaction and Move Transaction

### *Auto Labor Report*

- Controls whether run labor reporting is generated automatically by Backflush Transaction
- *If this field = Yes*, the Backflush Transaction automatically reports the standard number of run hours for the Quantity Processed entered for this operation as well as any prior nonmilestone operations where this field is set to *Yes*
  - This is reported in addition to any labor hours entered in the transaction
- *If this field = No*, labor hours do not report automatically.

In this case, you should report labor explicitly in either Backflush Transaction or Run Labor Transaction.

In both cases, you must report all setup labor using Setup Labor Transaction.

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## Purchase Order Maintenance

Purchase Order Maintenance x

Go To Actions Copy Print Preview

Header Lines Trailer

Lines Line Details Tax Info Comments

**Header**

Purchase Order: PD1008 Supplier: SU100 Ln Format S/M: Single

Ln	Site	Requisit	Item Number	Qty Ordered	UM	Unit Cost	Disc%
1	proto		Hot Stamp	100.0	EA	2.50	0.00%

**Line Details**

Qty Received: 0.0 Due Date: 1/19/2009 CRT Int: 0.00

Qty to Rel: 0.0 Pur Acct: 6600 Cons

Single Lot: Performance Date: 1/19/2009 Project:

Location: Need Date: 1/19/2009 Type: S

Item Revision: Sales/Job: Taxable:

Status: Fixed Price:  Inspection Requi: Cmnts:

Supplier Item: UM Conversion: 1.0000

Manufacturer: Stock UM Quantity: 100.0 EA

Description: Hot Stamp subcontract Update Avg/Last Cost:  Extended Net Cost: 250.00

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## Subcontract Processing: Purchase Order

- Set up a purchase order line, type S, to cover the subcontracted service.

Work Order:

ID:

Operation: 40

Subcontract Type:

Lot/Serial:

- If you know the work order number you can enter it in the pop-up window on the PO line.

The screenshot shows a software window titled "Subcontract Routing/Op PO M.". The window contains the following information:

- Site: PROTO
- Item Number: Hot Stamp
- Effective: 1/1/2009
- Routing: 1000-00
- Op: 40

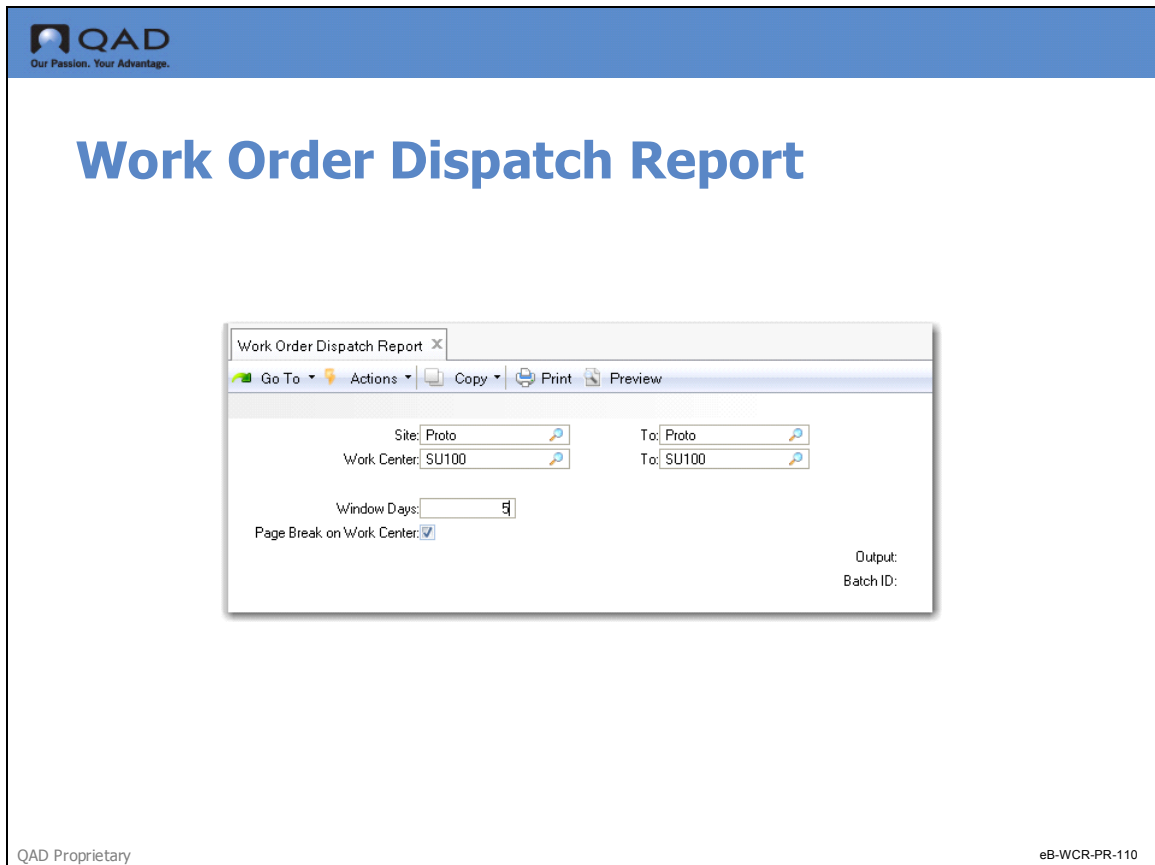
Below this information is a section titled "Purchase Orders" containing a table:

Supplier	Order	Line
SU100	P01008	1

At the bottom left of the screenshot area, it says "QAD Proprietary". At the bottom right, it says "eB-WCR-PR-100".

## Subcontract Processing: Subcontract Routing Op PO

Use Subcontract Routing Op PO to link the subcontract routing operation to the subcontract line item on the purchase order.



## Work Order Dispatch Report


By selecting appropriate work centers, that is the work centers you have setup for your suppliers who do subcontract your work. You can print a report on subcontracting operations.

The Work Order Dispatch Report prints in work center sequence and shows all work orders with operations in the selected work centers, between the report date and the window days. In the example shown here the report will list work order operations that call for work center SU100 between today and five days from now.

### **Subcontract Shop Floor Control**

Use shop floor control transactions to report the operation before the subcontract operation as complete and select Move Next Operation. This moves the WIP to the subcontract work center.

Use Purchase Order Receipts to receive the items back into WIP at the next operations. In the case where the subcontract operation is the last operation, the units may be received into an inventory location. It is common to have an inspection operation be the first operation after the subcontract operation to verify that all shipped units have been received and all are correct.



## Work Order WIP Cost Report

Work Order WIP Cost Report X

Go To Actions Copy Print Preview

Account: <input type="text"/>	To: <input type="text"/>
Sub-Account: <input type="text"/>	To: <input type="text"/>
Cost Center: <input type="text"/>	To: <input type="text"/>
Project: <input type="text"/>	To: <input type="text"/>
Work Order: <input type="text"/>	To: <input type="text"/>
ID: <input type="text"/>	To: <input type="text"/>
Item Number: <input type="text" value="1000-00"/>	To: <input type="text" value="1000-00"/>
Site: <input type="text"/>	To: <input type="text"/>
Sales/Job: <input type="text"/>	
Supplier: <input type="text"/>	

QAD Proprietary eB-WCR-PR-130

Use the Work Order WIP Cost Report to track WIP cost of subcontract operations

The screenshot shows a software window titled "Work Order Cost Report". At the top left is the QAD logo with the tagline "Our Passion. Your Advantage.". Below the logo is a large blue heading "Work Order Cost Report". The main content area displays a form with the following elements:

- Menu bar: Go To, Actions, Copy, Print, Preview
- Form fields:
  - Work Order: [text input]
  - ID: [text input]
  - Site: [text input]
  - Item Number: [text input]
  - Due Date: [dropdown menu]
  - Sales/Job: [text input]
  - Supplier: [text input]
  - Status: [text input]
  - Material: [dropdown menu, set to Detail]
  - Labor: [dropdown menu, set to Detail]
  - Burden: [dropdown menu, set to Detail]
  - Subcontract: [dropdown menu, set to Detail]
  - Page Break on Work Order: [checkbox, checked]
  - To: [text input]
  - To: [text input]
  - To: [text input]
  - To: [text input]
  - To: [dropdown menu]
  - Output: [text input]
  - Batch ID: [text input]

At the bottom left of the screenshot area, it says "QAD Proprietary". At the bottom right, it says "eB-WCR-PR-150".

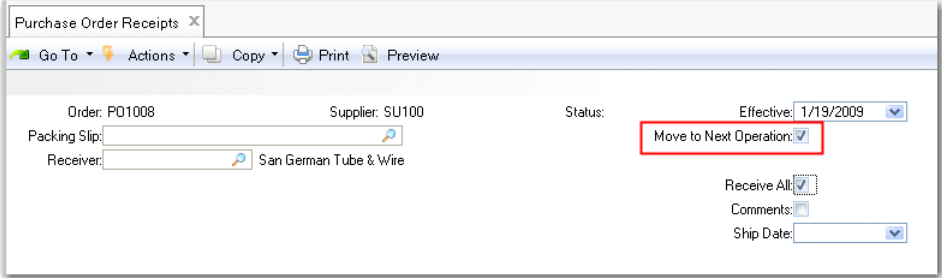
## Work Order Cost Report

Use the Work Order Cost Report to see total work order cost including the cost of subcontract operations

You can print this and other reports by supplier code

**QAD**  
Our Passion. Your Advantage.

## Purchase Order Receipts (1 of 2)



QAD Proprietary eB-WCR-PR-180

### Purchase Order Receipts

- You receive subcontract items into WIP
- The receipt updates the quantity completed at the designated WO operation and sets the operation status to C
- You can specify to *Move to Next Operation* to set the status of the next operation to [Q]ueue so it will appear on the dispatch list

**Purchase Order Receipts (2 of 2)**

Order: PO1008      Supplier: SU100      Status:      Packing Slip:

Ln	Item Number	UM	Qty Open UM	Receipt Qty UM	Project	Due Date	T
1	Hot Stamp	EA	100.0 EA	0.0 EA		1/19/2009	S

Line: 1      Unit of Measure:      Site:      Loc:

Quantity:      ID:      Lot/Ser:

Packing Qty:      OP:      Reference:

Cancel B/O:       Supplier Lot:

Item Number:      Multi Entry:       Chg Attribute:

Supplier Item:      Cmmts:

QAD Proprietary eB-WCR-PR-190

If the operation has been completed (status “C”) before the purchase order receipt, then the cost of the subcontract operation does not go to WIP, but remains in cost of production.

## Exercise: Subcontract Operations

Description: Marketing has decided to add a Hot Stamp Logo to the Roller Bearing Hub Assembly. San German Tube and Wire has agreed to to this operation.

- 1 Use Department Maintenance 14.1 to Setup Department 99 for subcontract work.
- 2 Use Work Center Maintenance 14.5 to Setup Work Center SU100 for the subcontract work. Leave all of the rate fields blank, assign the work center to department 99.
- 3 Use Item Master Maintenance 14.1 to add Item Number "Hot Stamp." Assign it to product line 1000, Status Code "ACT" and set Purchase/Manufacture code to P.
- 4 Use Routing Maintenance 14.13.1 to add operation 40, Hot Stamp, to route 1000-00.
- 5 Use Purchase Order Maintenance 5.7 to add a PO for supplier SU100 line one Hot Stamp, and make sure the Ln Format S/M field is set to "Single."
- 6 Use Subcontract Routing/Op PO Maintenance 5.11 to link the subcontract routing operation to the subcontract line item on the purchase order.









## Course Overview

- ✓ Identify some key business issues you need to consider before setting up work centers and routings in QAD Enterprise Applications
- ✓ Set up the shop calendar, departments, work centers, comments, standard operations, routings, and processes in QAD Enterprise Applications
- ✓ Process subcontract operations in QAD Enterprise Applications

APPENDIX A

# **Answers to Study Questions**

## Answers to Study Questions

- 1 The primary uses of departments are:
  - Accounting
    - GL account defaults are established by department.
  - Capacity requirements planning
    - Labor capacity of associated work centers.
- 2 There is no one correct answer. You need to look at how your company reports capacity and production costs.
- 3 False. Mach/Op should be less than or equal to the number of machines in the work center.
- 4 The key here is that wait time cannot be compressed. Usually, wait time is specified for mandatory processes like cooling, drying, or curing.
- 5 False. You must run Routing Update to do this.

APPENDIX B

# **General Ledger (GL) Effects**

Function	Notes	DR / CR	Account	Defaults From
Routing Cost Roll-Up using standard cost set		DR	Inventory	Inventory Account Maintenance*
		CR	Cost Revaluation	Inventory Account Maintenance*

\*The GL account defaults from the inventory item/site account if one is set up; otherwise, from the product line.

APPENDIX C

# **Work Center and Routing Reports**

**Work Centers / Routings Menu**

<b>Report</b>	<b>Function / Purpose</b>
Department Browse	This browse displays department information.
Department Report	This report lists department information.
Work Center Browse	This browse displays work center information.
Work Center Report	This report lists work center information.
Standard Operation Browse	This browse displays standard operation information.
Standard Operation Report	This report lists standard operations.
Routing Inquiry	This inquiry displays routings.
Routing Report	This report lists routings.
Routing Cost Report	This report lists routing costs as calculated by the Routing Cost Roll-Up
Item Routing Cost Report	This report lists item costs based on the routing cost roll-up.
Operation Cost Browse	This browse displays operation cost information based on Operation Cost Calculation
Operation Cost Report	This report lists operation cost information based on Operation cost Calculation

APPENDIX A

# **QAD Product Costing**

## Product Costing in QAD Enterprise Applications

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

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

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

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

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

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

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

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

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

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

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

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



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