Shop Floor Control

TRAINING GUIDE

70-2858A
Database: Train eB 2
July 2003

QAD Inc.
100 Innovation Place
Santa Barbara, California 93108
Phone (805) 684-6614
Fax (805) 684-1890
http://www.qad.com

Contents

QAD

About This Course

Course Description

QAD designed this course to cover the basics of preparing to implement the Shop Floor Control module of MFG/PRO. The course includes:

- An introduction to the Shop Floor Control module
- An overview of key business issues
- Setting up the Shop Floor Control module
- Operating the Shop Floor Control module
- Activities and exercises

Students learn how to:

- Analyze key business issues before setting up the Shop Floor Control module
- Set up and operate the Shop Floor Control module

Who Should Attend This Course

- Implementation consultants
- Members of implementation teams
- Manufacturing managers and key users

Prerequisites

- *Initial MFG/PRO Setup, Work Orders, and Work Centers, Routings, and WO Subcontracting* training courses
- Basic knowledge of:
  - MFG/PRO as it is used in the business
  - The manufacturing industry in general

Approximate Length of Course

- This course is designed to be taught in one-half day

Certification Preparation

This course is one of several courses designed to assist students in preparing for QAD certification examinations. However, QAD does not guarantee anyone a passing grade as a result of having taken this course.

Students preparing for certification examinations should study all available materials (user guides, training guides, and online help, for example) and acquire industry and field experience.

Using This Training Guide

Implementation consultants, members of implementation teams, and operators can use this guide in instructor-led classes, while knowledgeable consultants who want to learn about the Shop Floor Control module can use this guide for self-study.

This training guide provides a road map for instruction and learning. It contains the following:

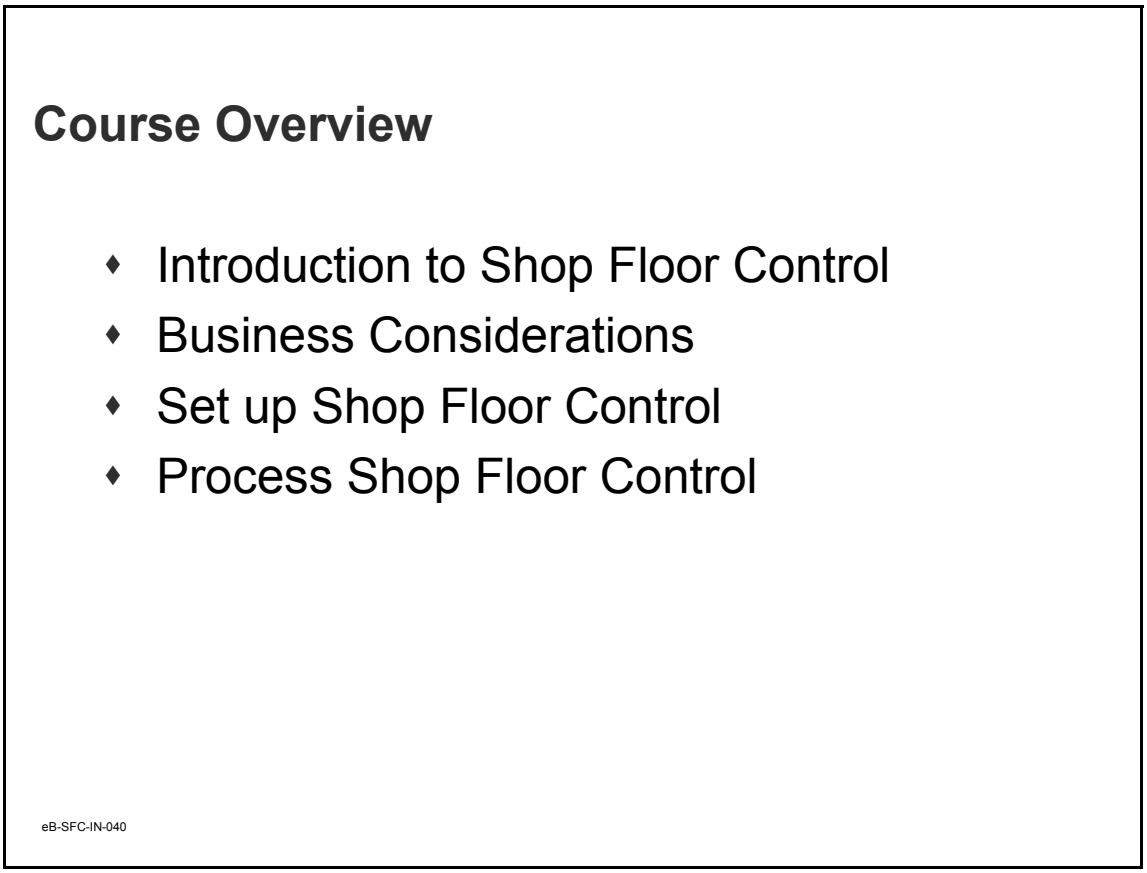
- Annotated PowerPoint slides for instructors
- MFG/PRO screens annotated for instructors to demonstrate the module's functionality
- Exercises and study questions

General Training Facilities Information

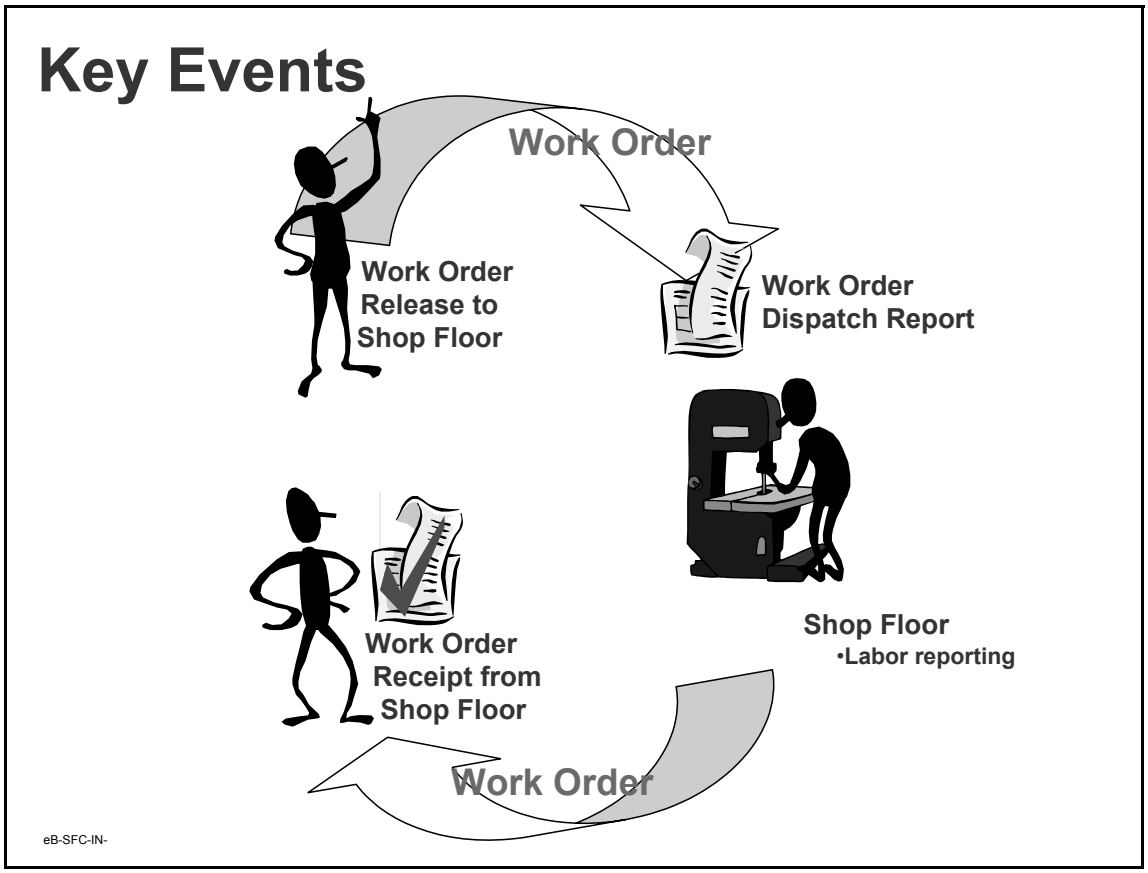
- Telephone or fax
- Messages
- Restrooms
- Class hours: start and finish times, and punctuality
- Breaks: frequency, approximate times
- Parking considerations; carpooling
- Emergency procedures: location of first aid, contact person for assistance
- Exit locations, building hours
- Location of approved smoking area

CHAPTER 1

Introduction to Shop Floor Control



Course Overview



Shop Floor Control Defined

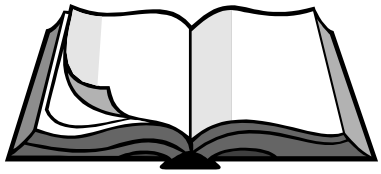
Shop Floor Control is a system for using data from the shop floor to maintain and communicate status information on shop (manufacturing) orders and work centers. (Source: APICS Dictionary)

- Use Shop Floor Control (SFC) when management of production priorities requires work order operations visibility and/or when labor costs are a large part of total production costs
  - When these are true, it is also likely that products have many operations or long lead times, work center queues are relatively long, and labor costs and variances need to be related to products and work centers

The SFC module is exclusive of the Repetitive module. Repetitive has its own labor reporting system.

Terminology

- Computer-integrated manufacturing (CIM) interface
- Work in process (WIP)
- Queue
- Dispatch list
- Input/output control
- Downtime
- Reason codes
- Utilization
- Efficiency
- Capacity
- Direct/indirect labor



eB-SFC-IN-060

Terminology

Computer Integrated Manufacturing (CIM) Interface

The CIM interface takes import transactions from an external file or system and loads them into MFG/PRO.

Work in Process (WIP)

WIP indicates a product in various stages of completion throughout the plant. Stages include raw material released for manufacturing up to completely processed material awaiting final inspection and acceptance as finished product.

Queue

a A waiting area

b The time work normally waits at a work center before the operations begin

c A holding area for calls, call quotes, and service requests before the next event takes place in their life cycle

Dispatch List

A dispatch list is a listing of all manufacturing orders ranked in relative priority. The list contains information of priority, location, quantity, and the capacity requirements of the order by operation.

Dispatch lists are normally generated daily and broken down by work center.

Input/Output Control

Input/output control is a technique for capacity control where actual output from a work center is compared with the planned output developed by capacity requirements planning (CRP). Input is also monitored to see if it corresponds to plan and is adequate for the work center to meet its capacity requirements.

Downtime

Downtime is time when a resource is scheduled for operation but is not producing for reasons, such as maintenance, repair or setup.

Reason Code

a In the Sales Quotes, Repetitive, and Shop Floor Control modules, a reason code is a code that categorizes or describes a transaction.

b In the Product Change Control module, reason codes are user-defined and specify severity levels related to approval of change documents.

Utilization

Utilization is a measure of how well a resource is being used to produce goods or services. It compares actual time used to available time. Utilization is the ratio of:

– Direct time charged (run time plus setup) to the clock time scheduled for the resource

- Actual time (run time only) to the clock time the resource is scheduled to produce

Efficiency

The relationship between the planned standard time and actual time charged to the task. Efficiency is calculated by dividing the standard hours earned by the actual direct labor hours. Efficiency may be more than 100%.

Capacity

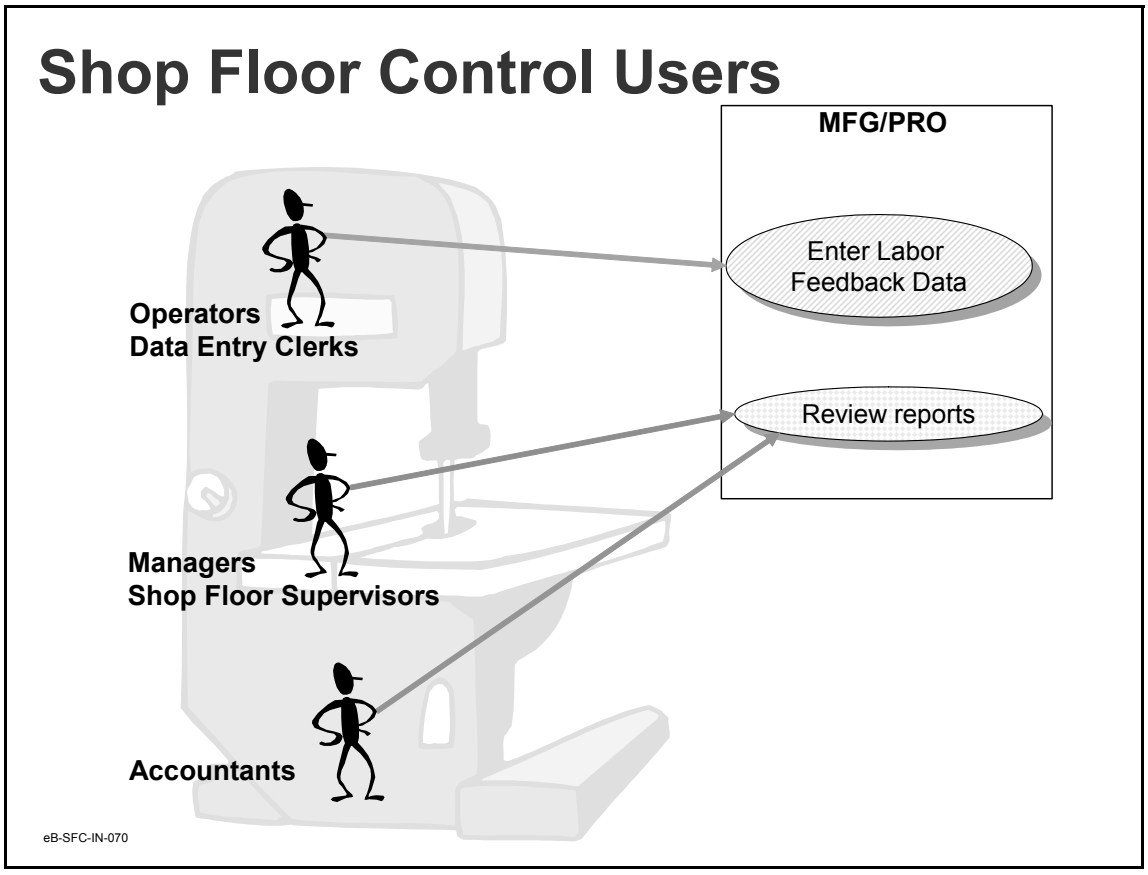
Capacity is the maximum work load for a work center, machine, and so forth.

Direct Labor

Direct labor is labor specifically applied to the product being manufactured or utilized in the performance of the service.

Indirect Labor

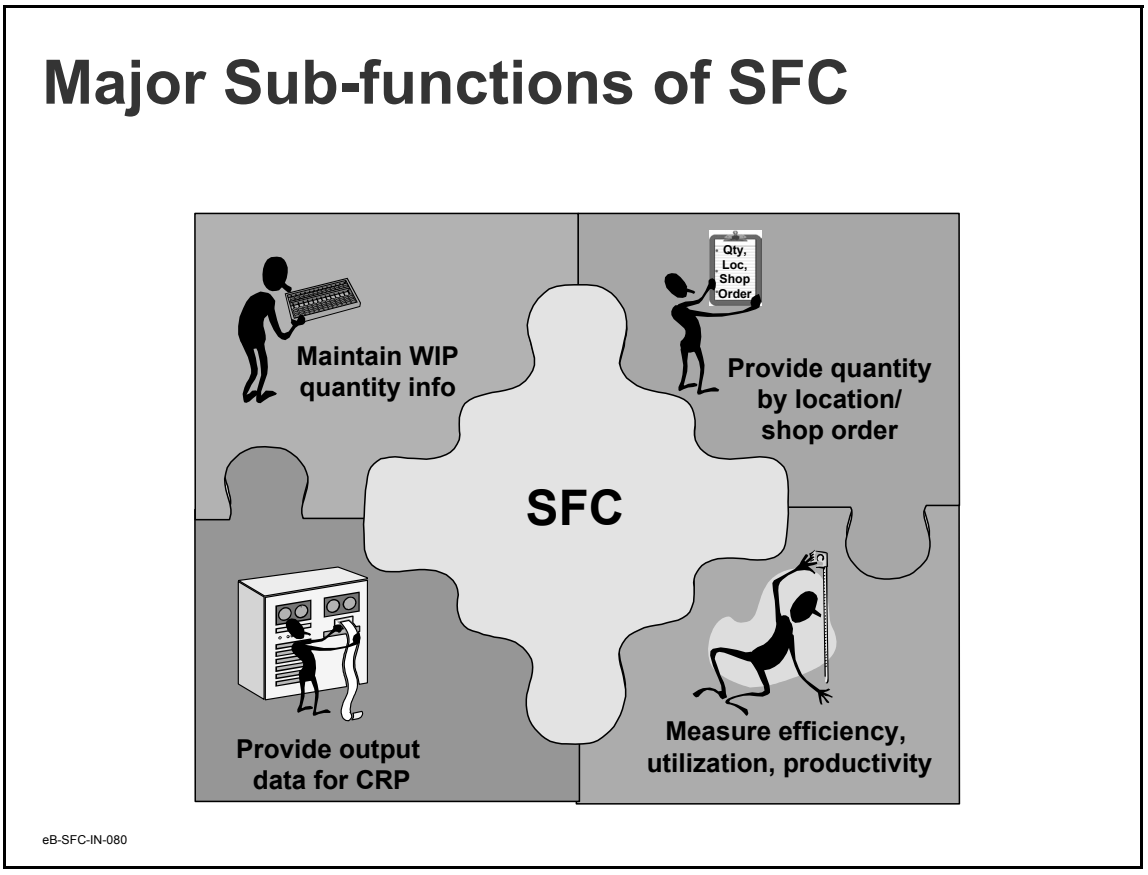
Indirect labor is the work necessary to support production without being related to the production of a specific item or product (meetings, for example).



Shop Floor Control Users

The Shop Floor Control module is used by managers, shop floor supervisors, accountants, data entry clerks, and operators.

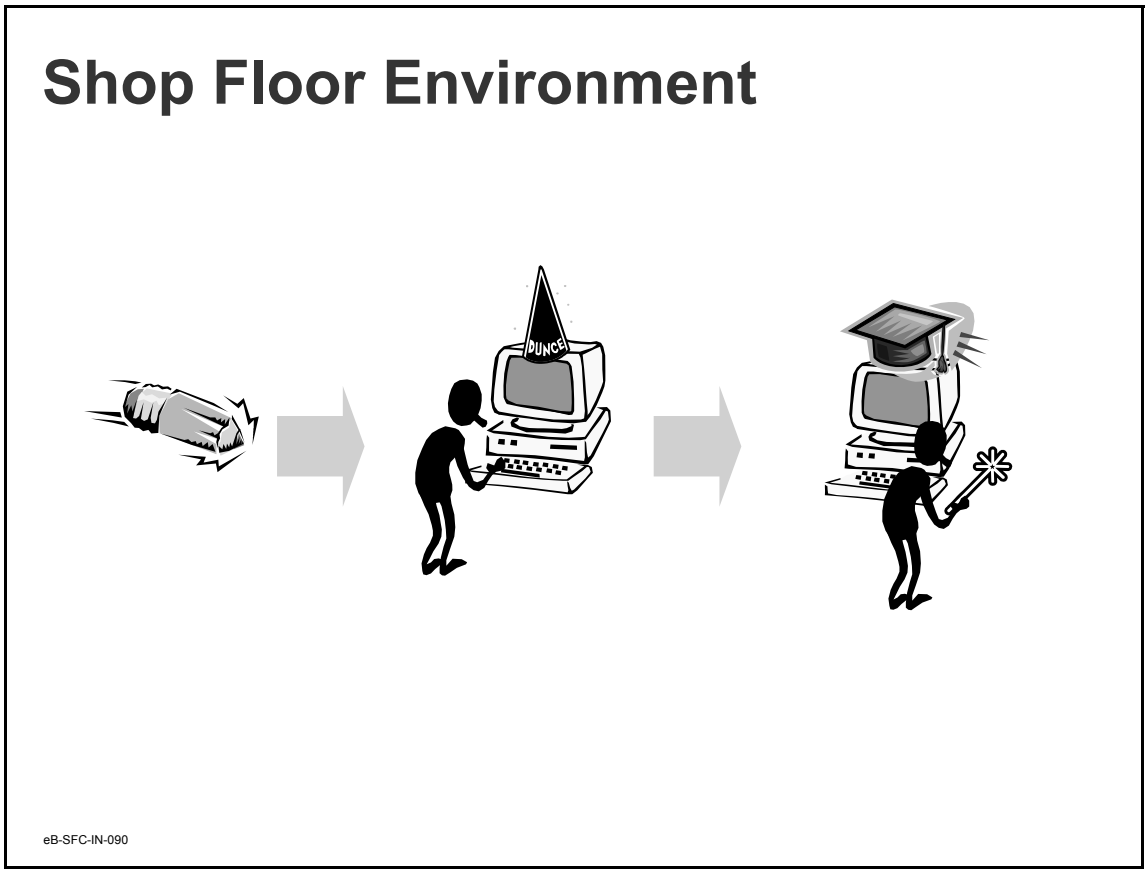
- Defining specific SFC users depends upon the primary business reason for using SFC – whether it is to track:
  - Labor time
  - Productivity
  - WIP



Major Sub-functions of SFC

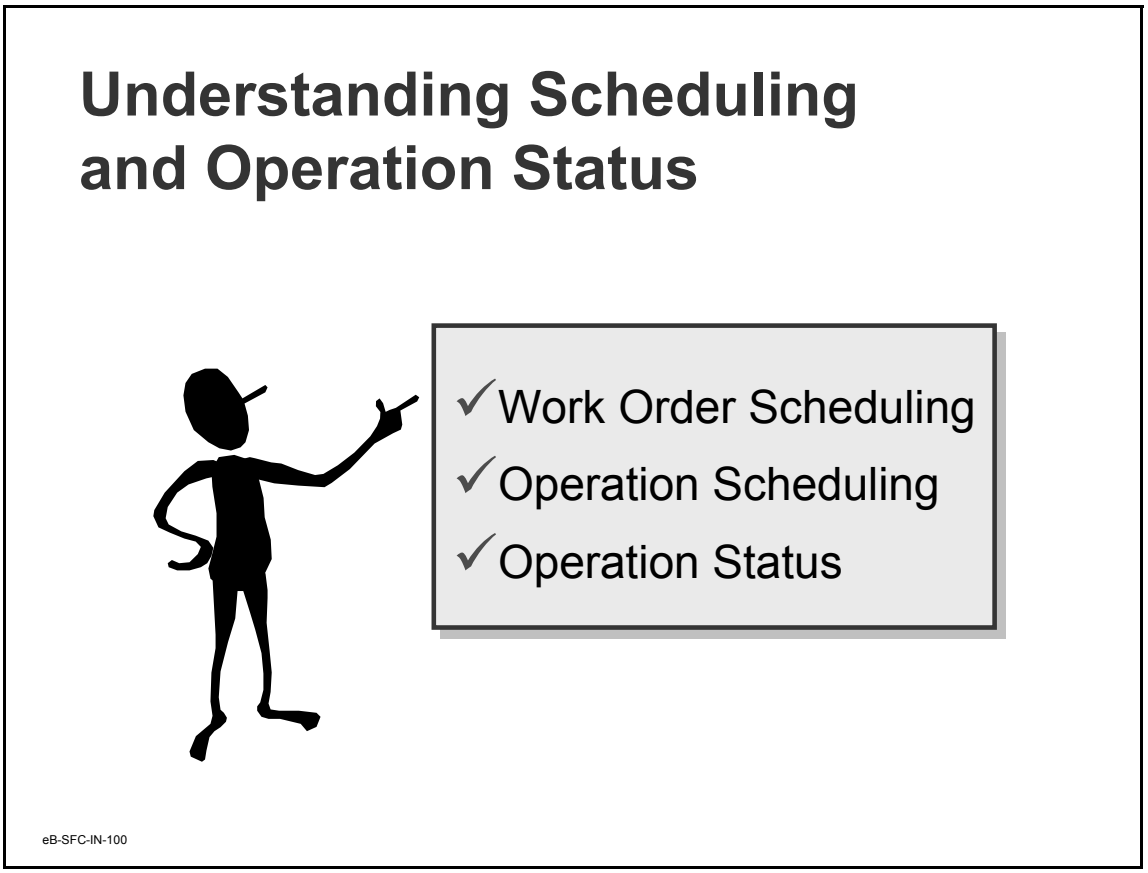
- Maintain WIP quantity information
- Provide quantity by location by shop order for WIP inventory and accounting purposes
- Measure of efficiency, utilization, and productivity of the work force and machines
- Provide actual output data for capacity control purposes

(Source: APICS Dictionary)

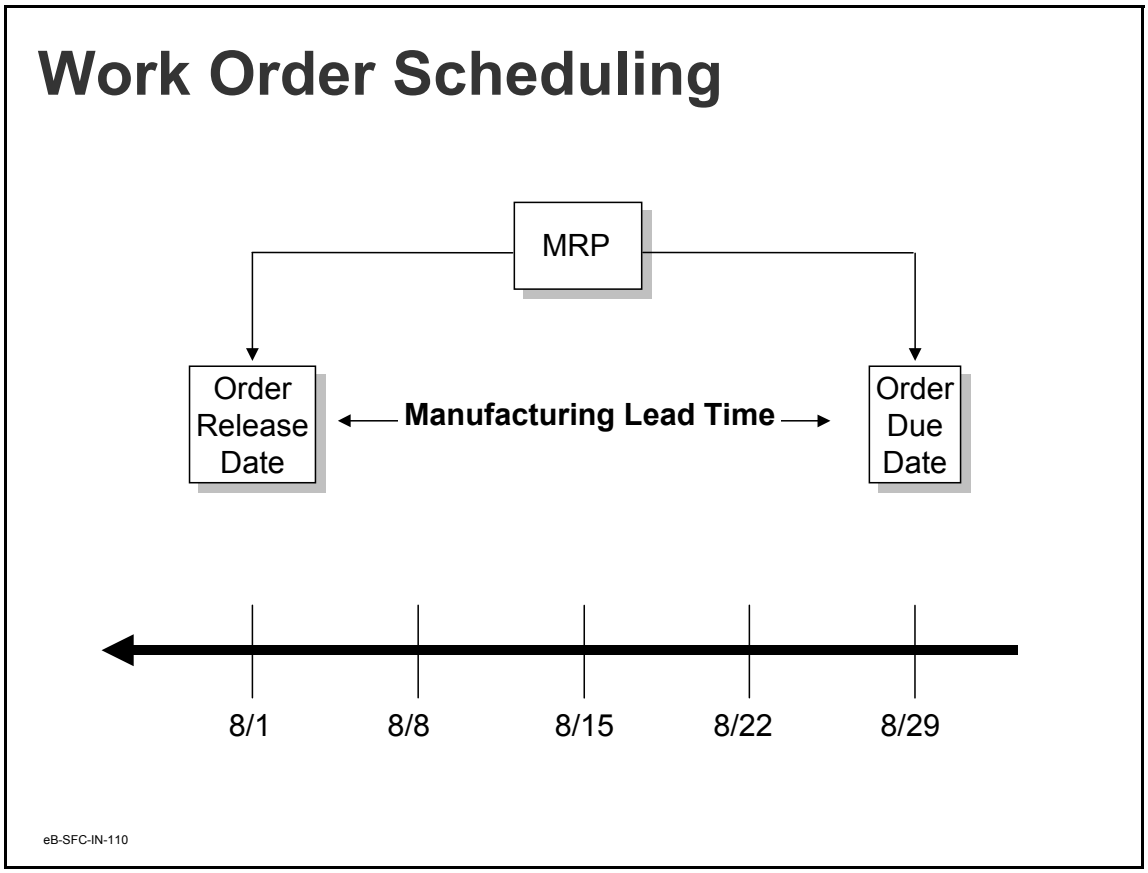


Shop Floor Environment

- Evolution from paper systems to “dumb” terminals to “smart” terminals
  - Automated reading systems and distributed computers facilitate data acquisition and shop-floor decision-making
  - Faster data acquisition with fewer errors
  - CIM interfaces



Understanding Scheduling and Operation Status

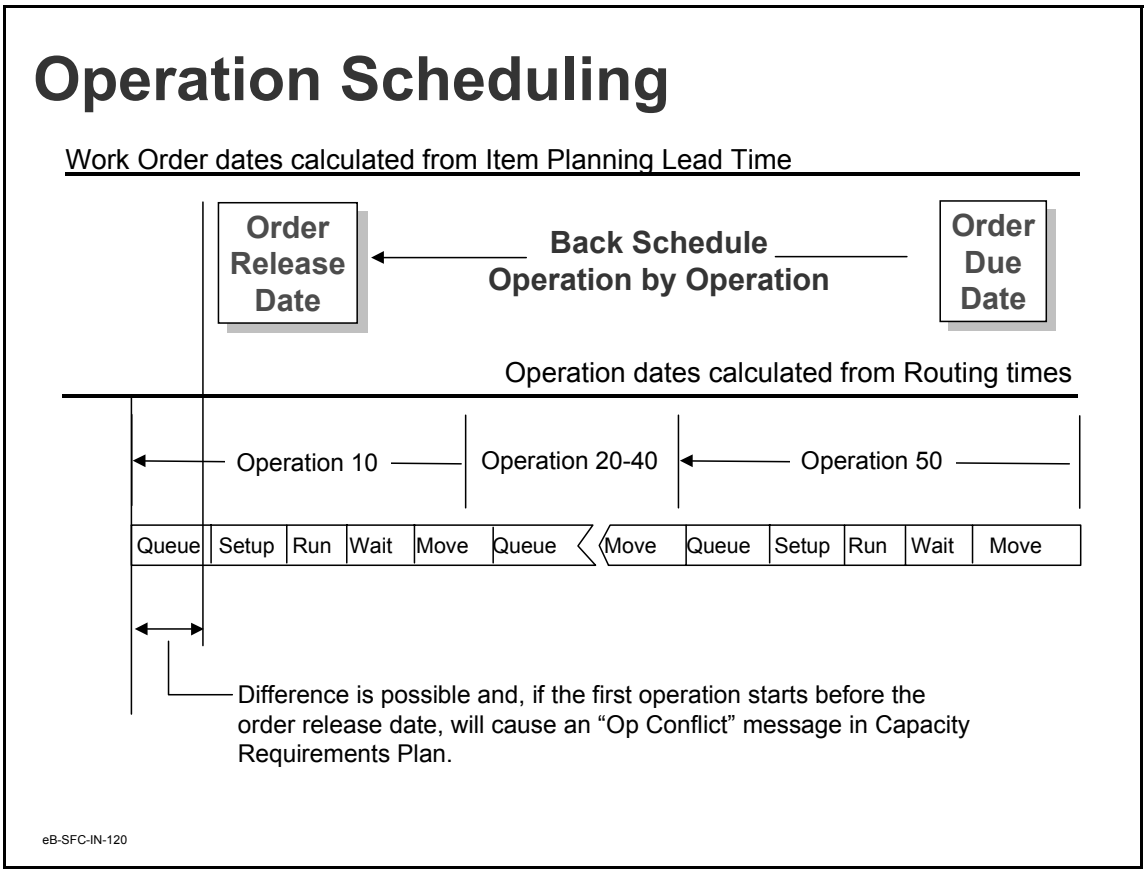


Work Order Scheduling

All planned work orders are automatically scheduled by MRP with respect to their release and due dates.

Backward Scheduling Method

MRP automatically calculates the planned order release date from the order due date. To determine the release date, MFG/PRO uses the manufacturing lead time to offset the number of shop days needed prior to the due date. The shop calendar is used to define the work week and identifies both shop and nonwork days. This is a backward scheduling method. From a planning perspective, it is critical to ensure that the lead times are accurate and that the planning horizon is sufficient in length to cover the longest lead time item.



Operation Scheduling

Back Scheduling

Work order operations are back scheduled from the MRP order due date. Back scheduling uses the standard operation setup, run, and move times along with work center queue and wait times. Operation start and end dates can be manually changed by the scheduler; however, these will revert if CRP is recalculated.

You can change operation time elements to increase or decrease operation times using Work Order Routing Maintenance.

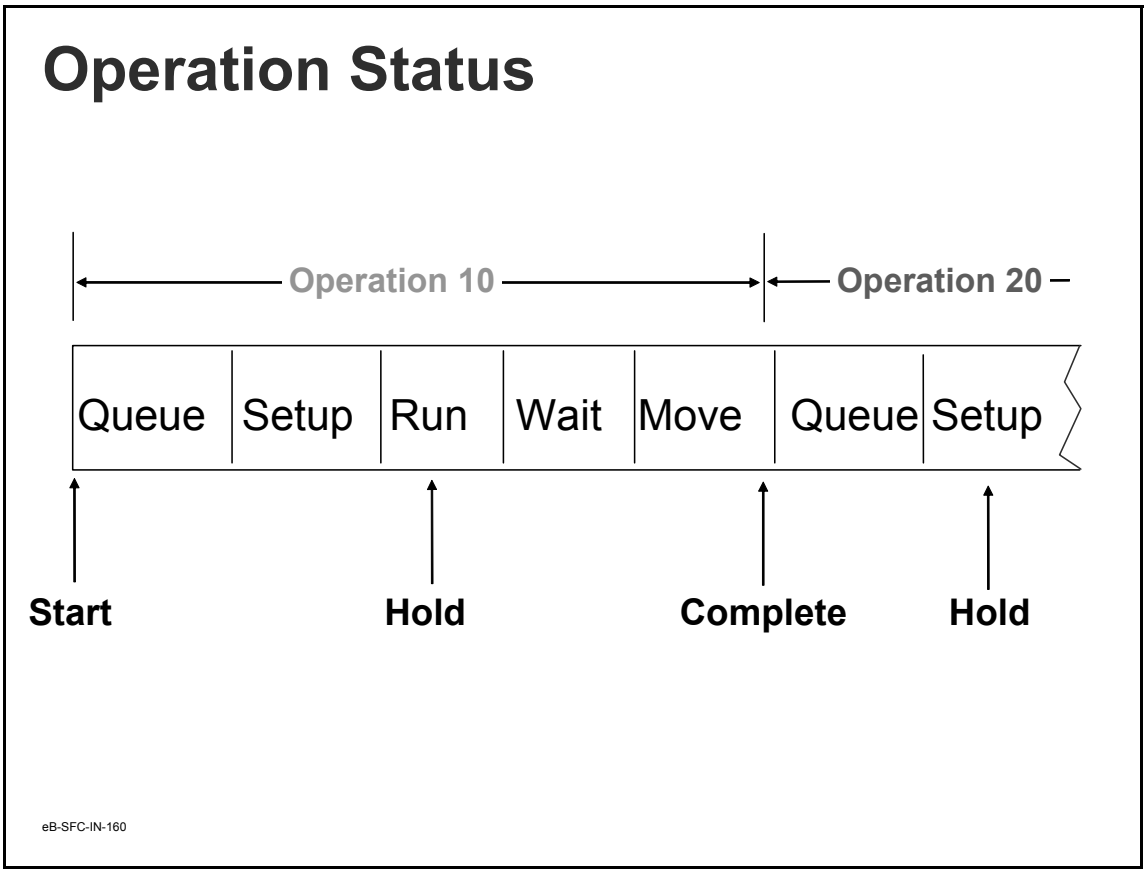
Op vs Order Dates

The work order release date is created by MRP by back scheduling from the order due date using manufacturing lead time. Because work order operations use routing times, order quantities much greater than the standard order quantity on the item master can push the first operation start date out past the order release date.

If the operation start date is prior to the order start date, a warning message of "Op Conflict" (operation conflict) is generated in the Capacity Requirements Planning (CRP) recalculation report.

Overlap Operations

Operation overlap is considered by the scheduling algorithm. Overlap specifies the number of items that must be completed before the next operation can begin. The overlap quantity can be specified in Routing Maintenance.



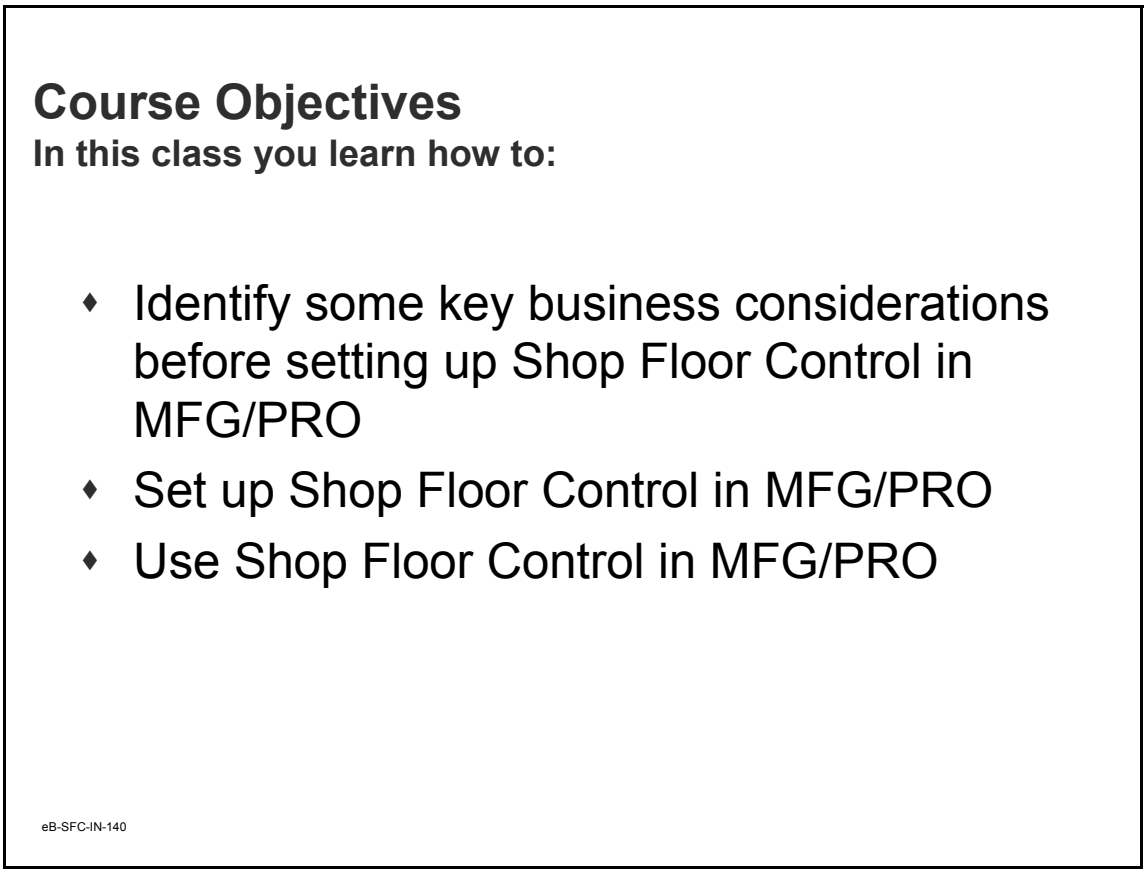
Operation Status Codes

Operation status codes are used to indicate the detailed status of an individual operation. The status codes can be entered manually using Work Order Routing Maintenance or automatically set when the Shop Floor Control Labor Feedback Transactions are used.

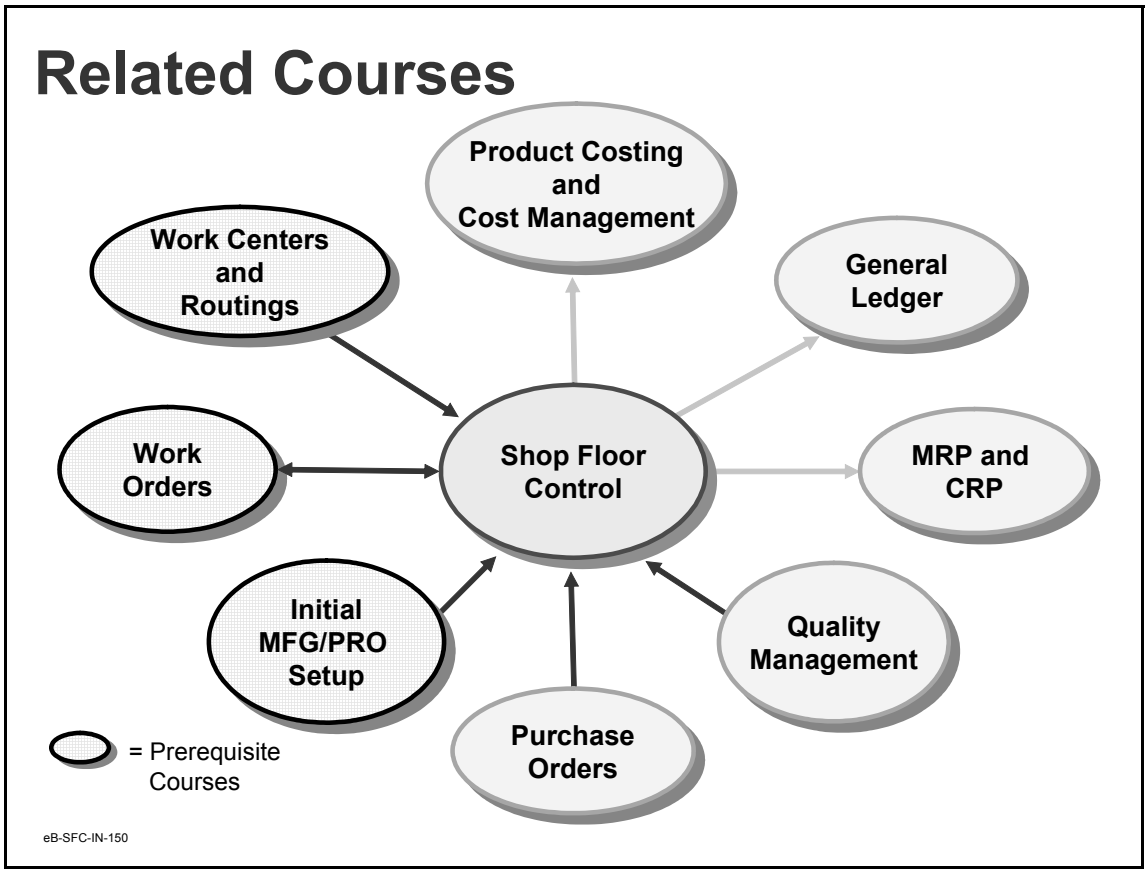
MFG/PRO identifies the following status codes:

- Queue (Q)
- Setup (S)
- Run (R)
- Complete (C)
- Hold (H)

The first operation can be set to status Queue automatically upon releasing the work order if the Move Next Operation field in the Shop Floor Control File is set to Yes. Succeeding operations can be set to Queue automatically when the previous operation is reported as Complete.



Course Objectives



Related Courses

Course Overview

- ✓ Introduction to Shop Floor Control
- ♦ Business Considerations
- ♦ Set up Shop Floor Control
- ♦ Use Shop Floor Control

eB-SFC-IN-160

CHAPTER 2

Business Considerations

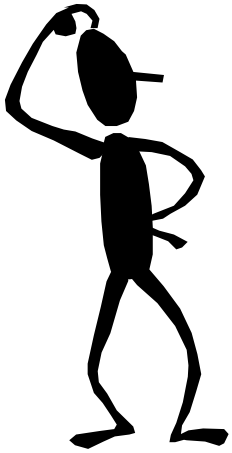
Business Considerations

In this section you learn how to:

- ✓ **Identify some key business considerations before setting up Shop Floor Control**
- Set up Shop Floor Control in MFG/PRO
- Process Shop Floor Control in MFG/PRO

eB-SFC-BC-010

Business Issues



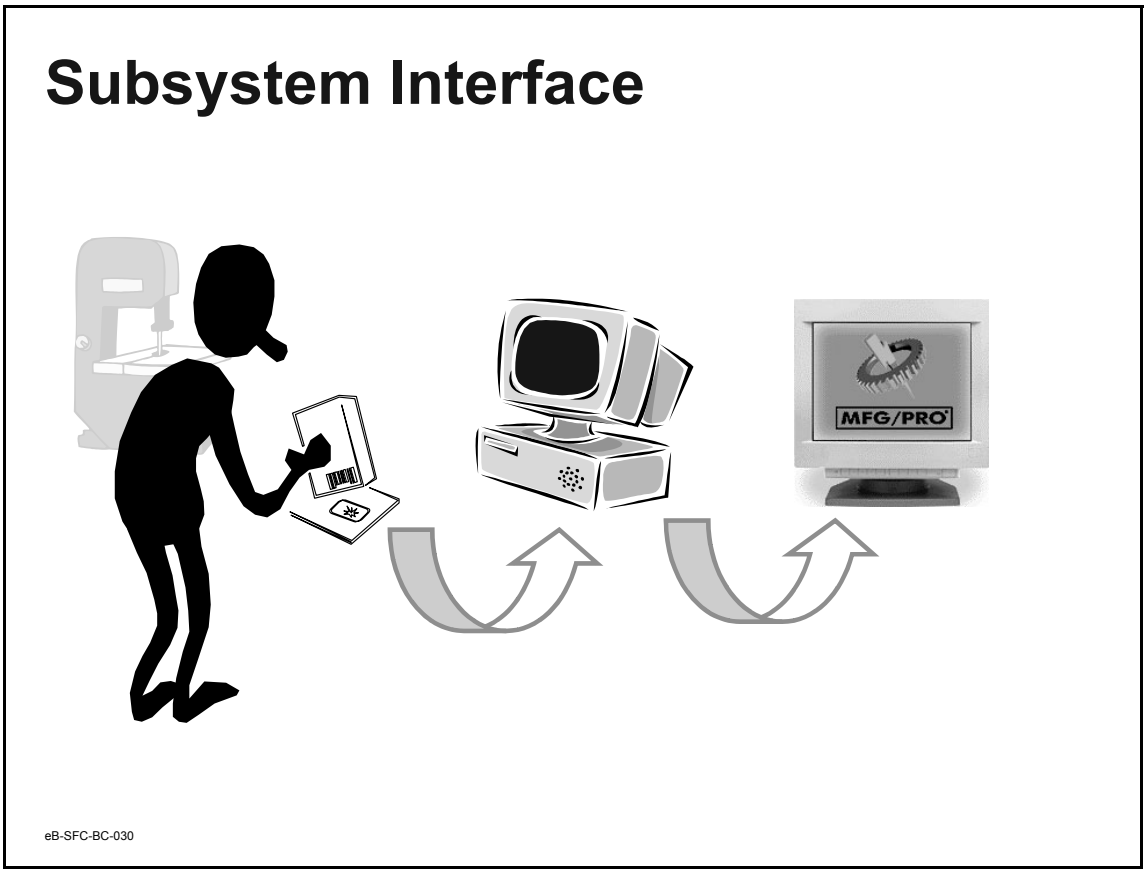
- ✓ Subsystem interface
- ✓ Subcontract work
- ✓ Reporting method
- ✓ Standard or actual
- ✓ Rejects
- ✓ Quality reporting

eB-SFC-BC-020

There are several business issues to take into consideration before setting up MFG/PRO Shop Floor Control (SFC). This section does not discuss all potential issues, but presents some issues to generate thought and discussion.

The key question to ask is:

- What is the primary business goal?
  - To track labor time?
  - To track productivity?
  - To track work in process (WIP)?

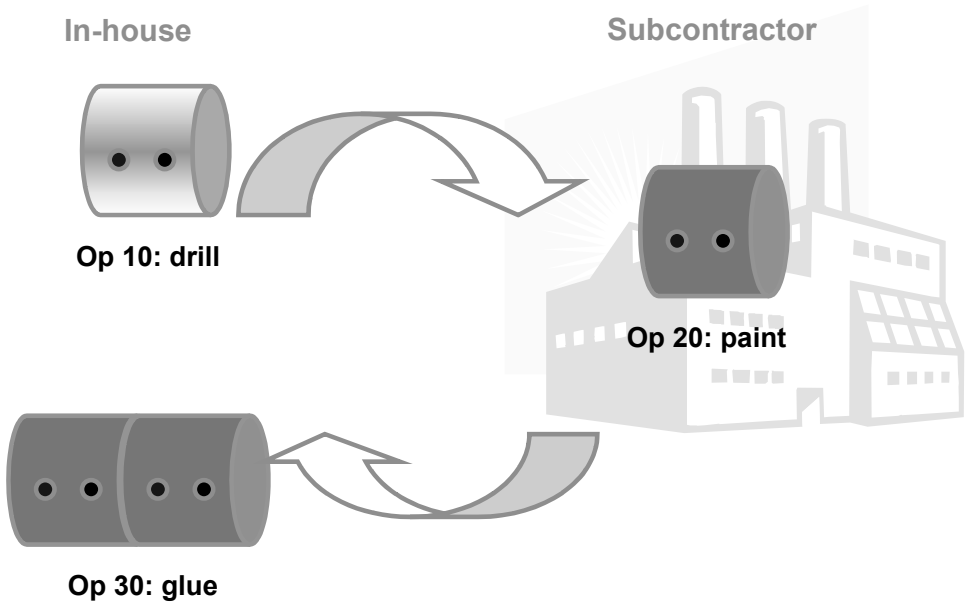


Subsystem Interface

If a subsystem is used to collect labor feedback data:

- Have interface issues been addressed?
- How will data be downloaded from the subsystem into MFG/PRO?

Subcontract Work



eB-SFC-BC-050

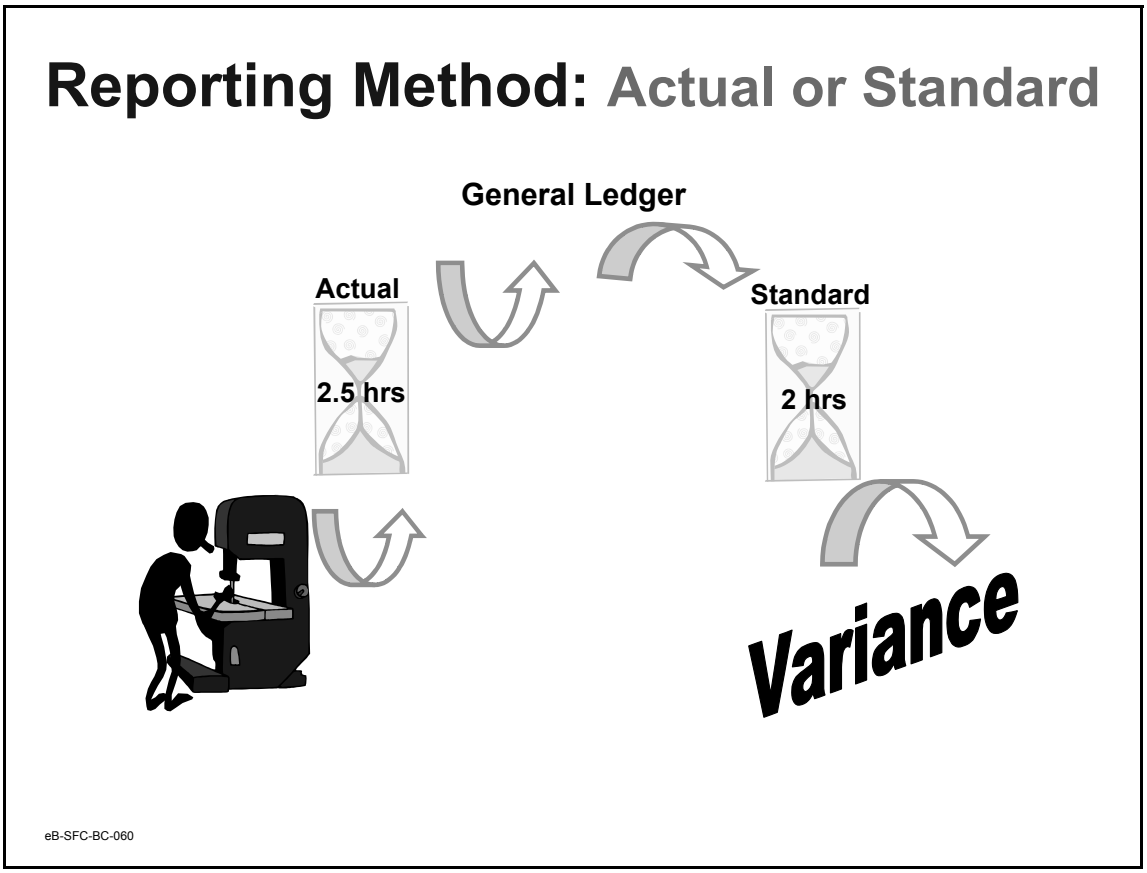
Subcontract Work

Some work order operations may need to be completed by outside suppliers/subcontractors.

- Subcontract operations may be necessary when there is insufficient manufacturing capacity or when operations require specialized equipment and machinery

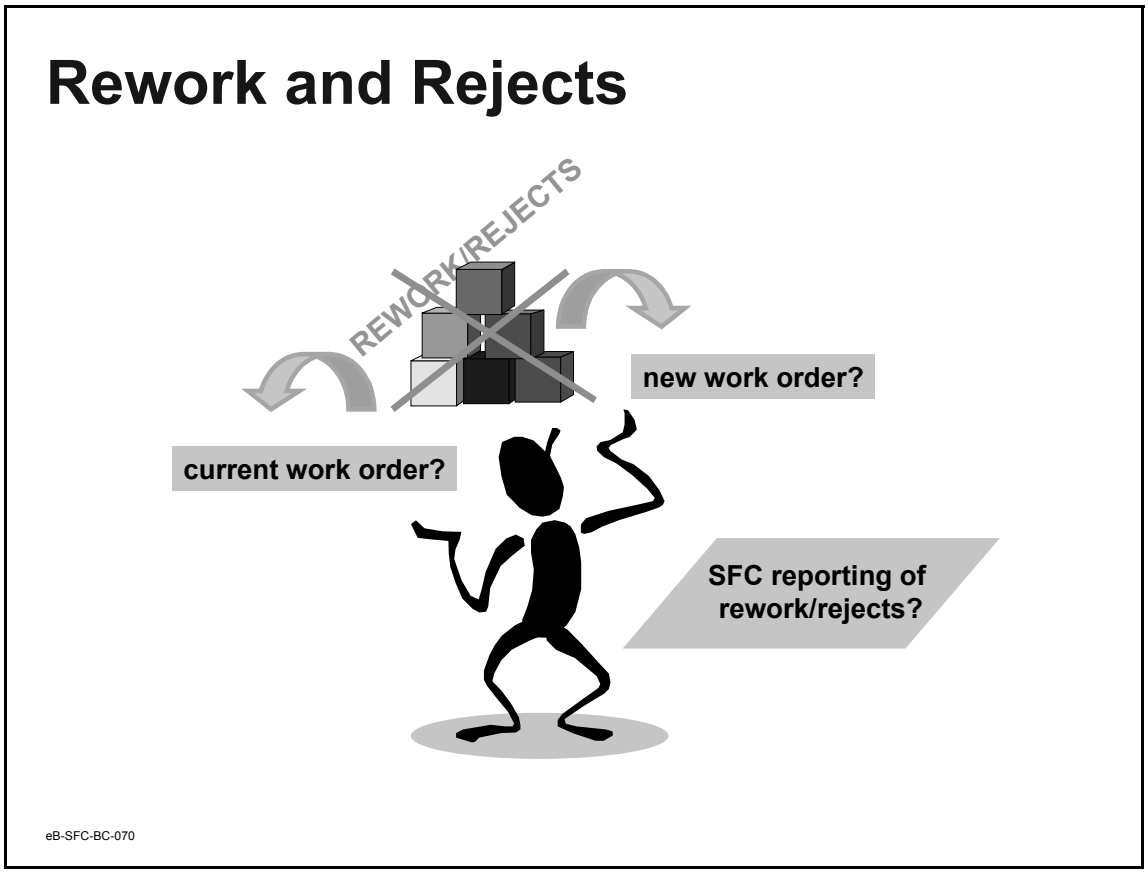
The SFC module may be used with the Work Orders (16) and Purchasing (5) modules in the subcontract cycle for closer tracking of WIP.

Subcontract items are received into WIP. The receipt updates the quantity completed at the designated work order operation and sets the operation status to C. In Purchase Order Receipts, 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.



Reporting Method

- Determine where labor reporting is important on the shop floor
  - At every operation, or at milestone operations?
- Determine whether actual or standard labor reporting is to be used
  - Choose one, based on business objectives



Rework and Rejects

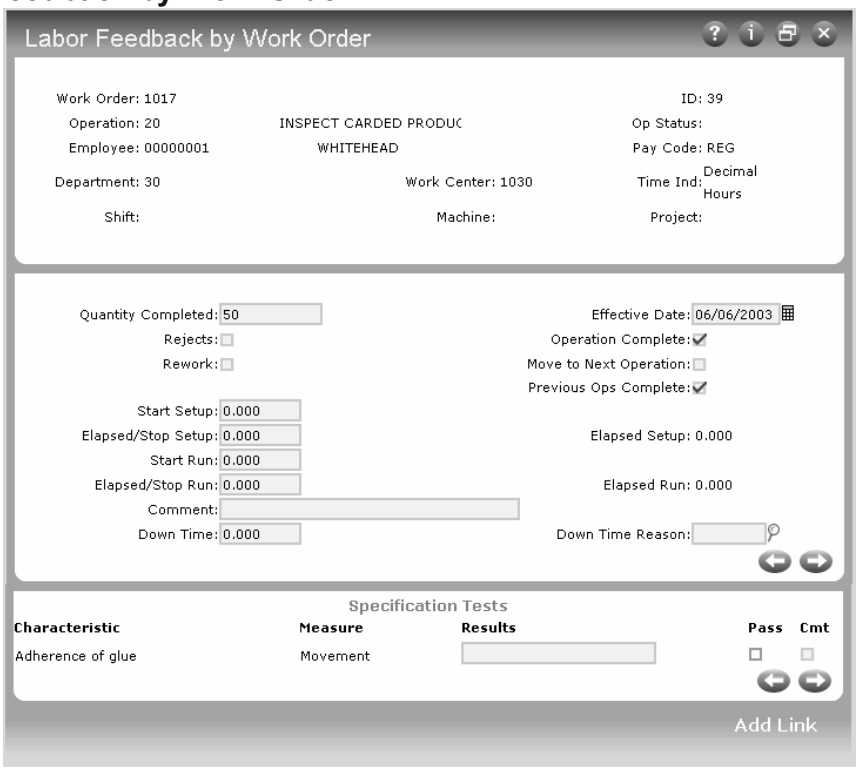
How are costs for rework/rejects captured?

- In the original production work order?
- In a new work order, type “R”?

Rework/rejects entered in SFC are recorded for reporting purposes only and have no consequence for the general ledger (GL).

- Based on costing approach, determine whether or not to record rework/rejects in SFC

Labor Feedback by Work Order



eB-SFC-BC-080

Quality Reporting

Testing procedures may be devised and routed along with the product throughout the production process. Actual test results may be entered in Labor Feedback Transactions with real-time notification of out-of-tolerance conditions.

Setup Implications

- To identify tests that must be performed as part of an operation, attach test specifications to routing operations by using Item Specification Maintenance.

Review

- Processes and procedures
- Reporting requirements
- Customer expectations
- Product configuration

eB-SFC-BC-090

Other Points to Review

Course Overview

- ✓ Introduction to Shop Floor Control
- ✓ Business Considerations
- ♦ Set up Shop Floor Control
- ♦ Use Shop Floor Control

eB-SFC-BC-100

CHAPTER 3

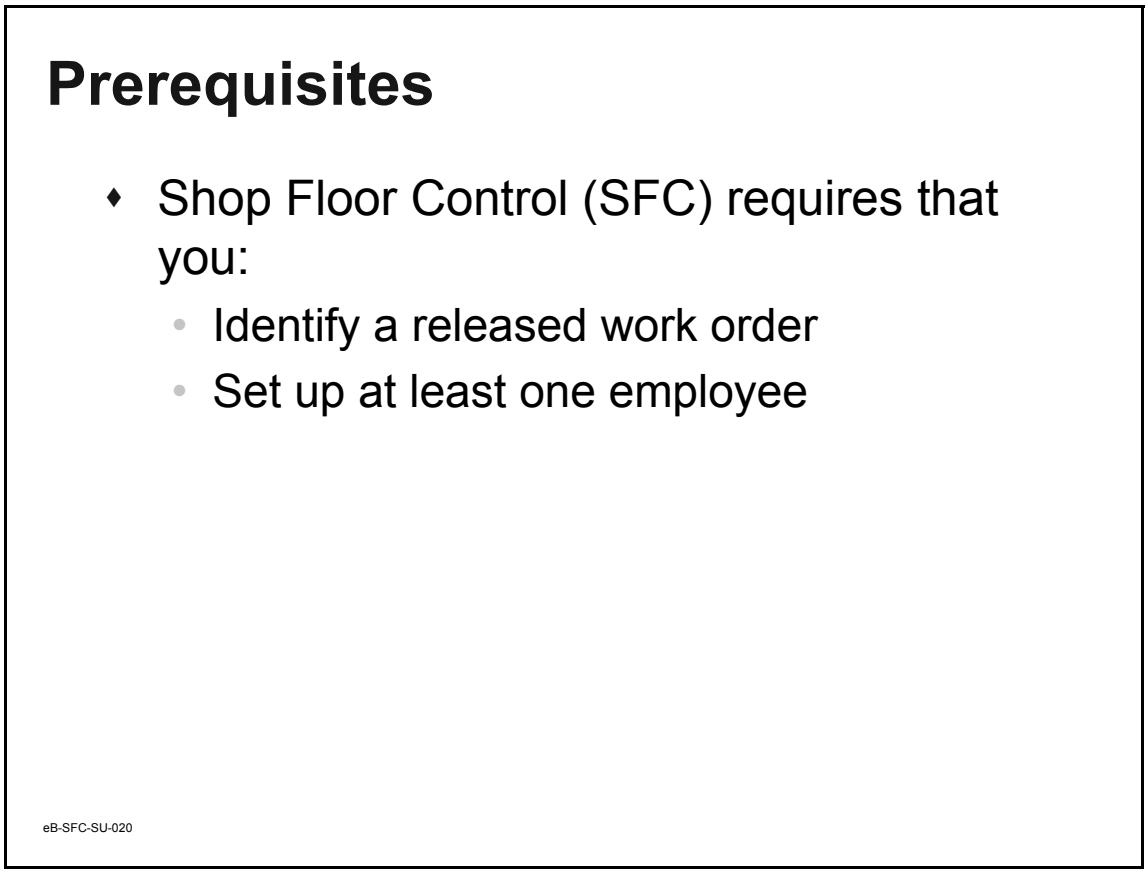
Set Up Shop Floor Control

Set up Shop Floor Control

In this section you learn how to:

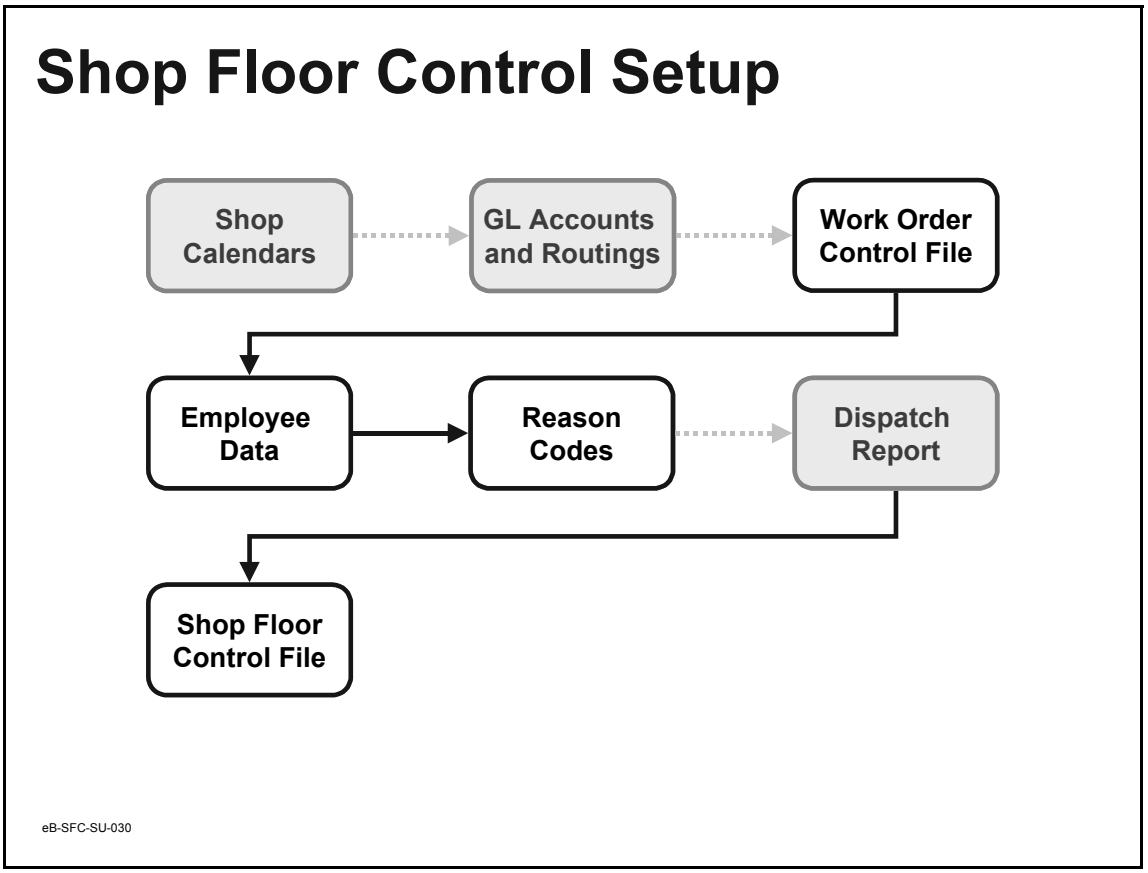
- ✓ Identify some key business considerations before setting up Shop Floor Control in MFG/PRO
- ✓ **Set up Shop Floor Control in MFG/PRO**

eB-SFC-SU-010



Prerequisites

- Labor feedback is entered by work order, employee or work center/machine. In all cases, you must identify a released work order.
- Labor and material movements are tracked in SFC. It requires that you set up at least one employee.
  - If you are using SFC to record operation transactions and not labor for individual employees, create a pseudo employee and record all time, operation moves, and completions against it

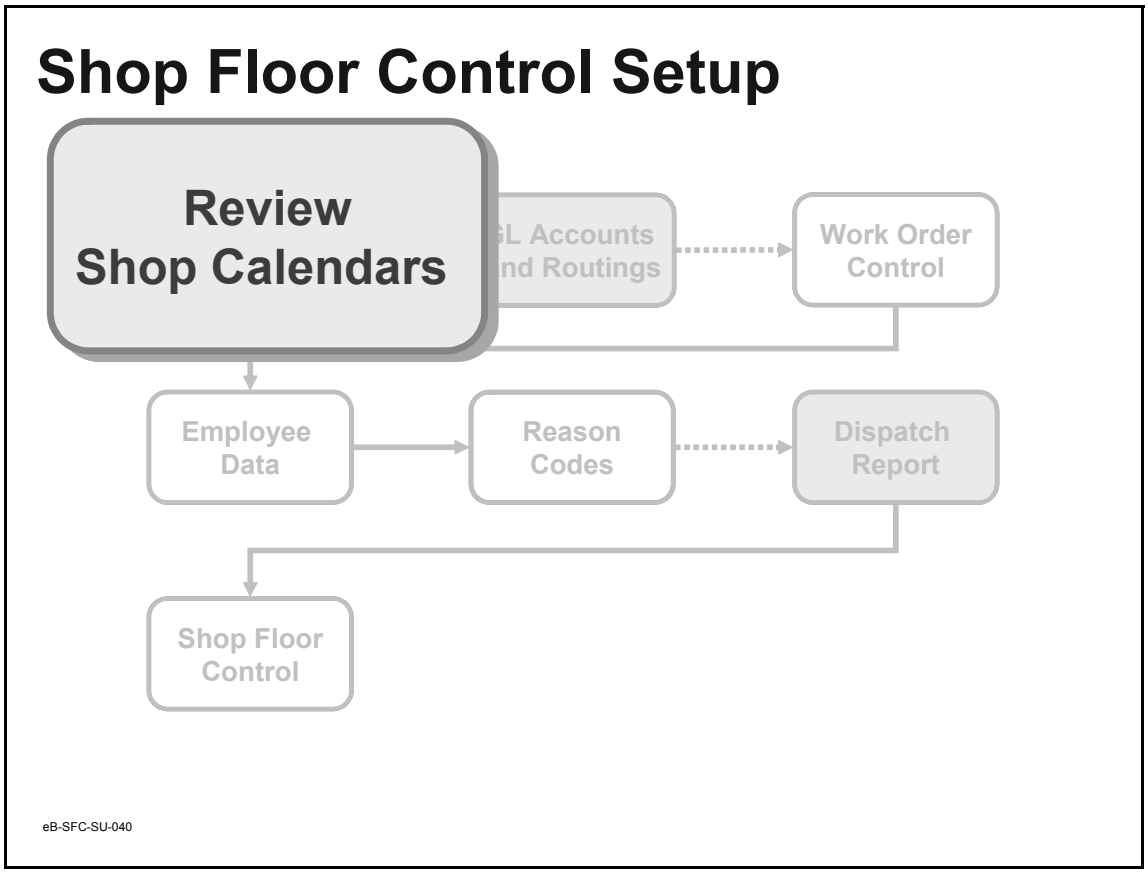


Shop Floor Control Setup

This illustration is a suggested setup sequence of master files for the Shop Floor Control module which is based on information that flows from one master file to another and prerequisites that need to be accomplished before setting up a file. Reading the illustration:

Boxes with solid lines are required to set up Shop Floor Control and are covered in this course.

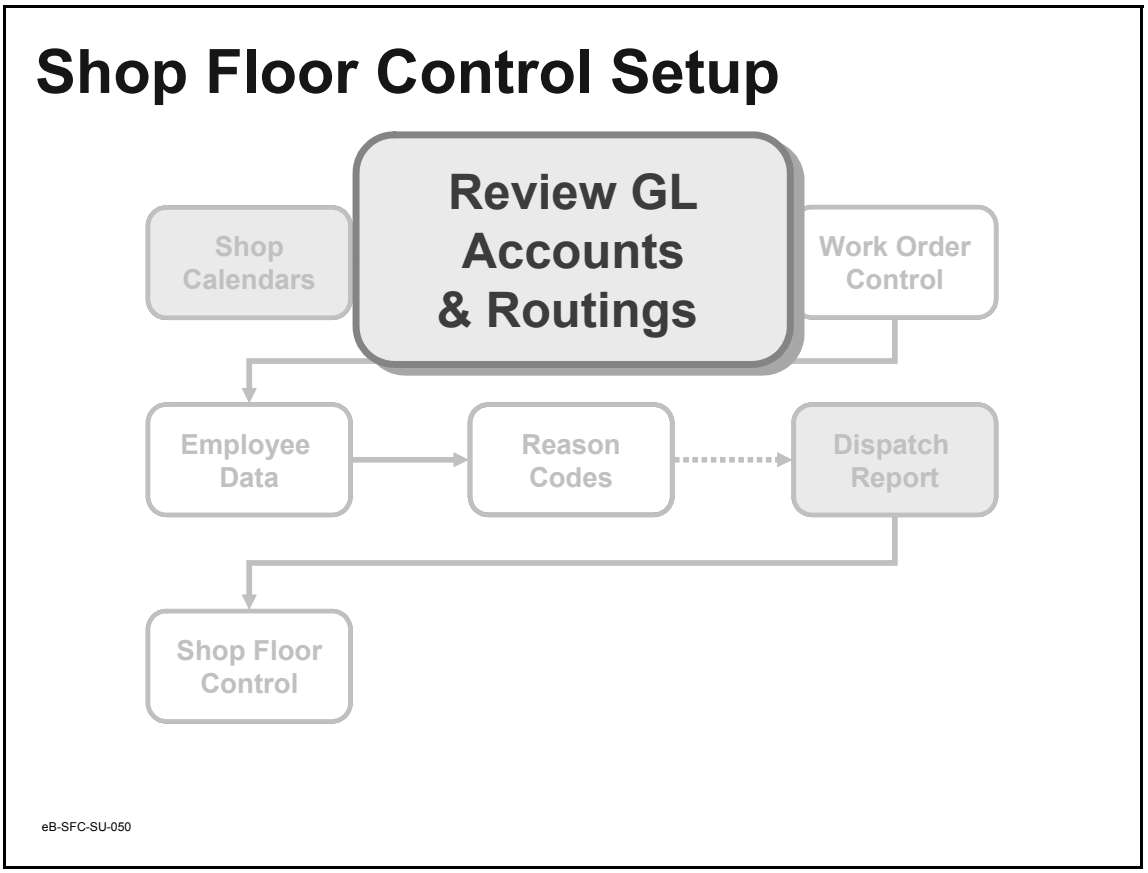
Shaded boxes reflect optional steps, but are covered in this course.



Review Shop Calendars

MFG/PRO eB allows separate shop calendars for each site/work center/machine that you create. Each can have its own work days and work day duration entered in Calendar Maintenance.

- Holidays that affect all calendars can be entered using Holiday Maintenance
- Work-center specific holidays must be entered through Calendar Maintenance using the Reference field

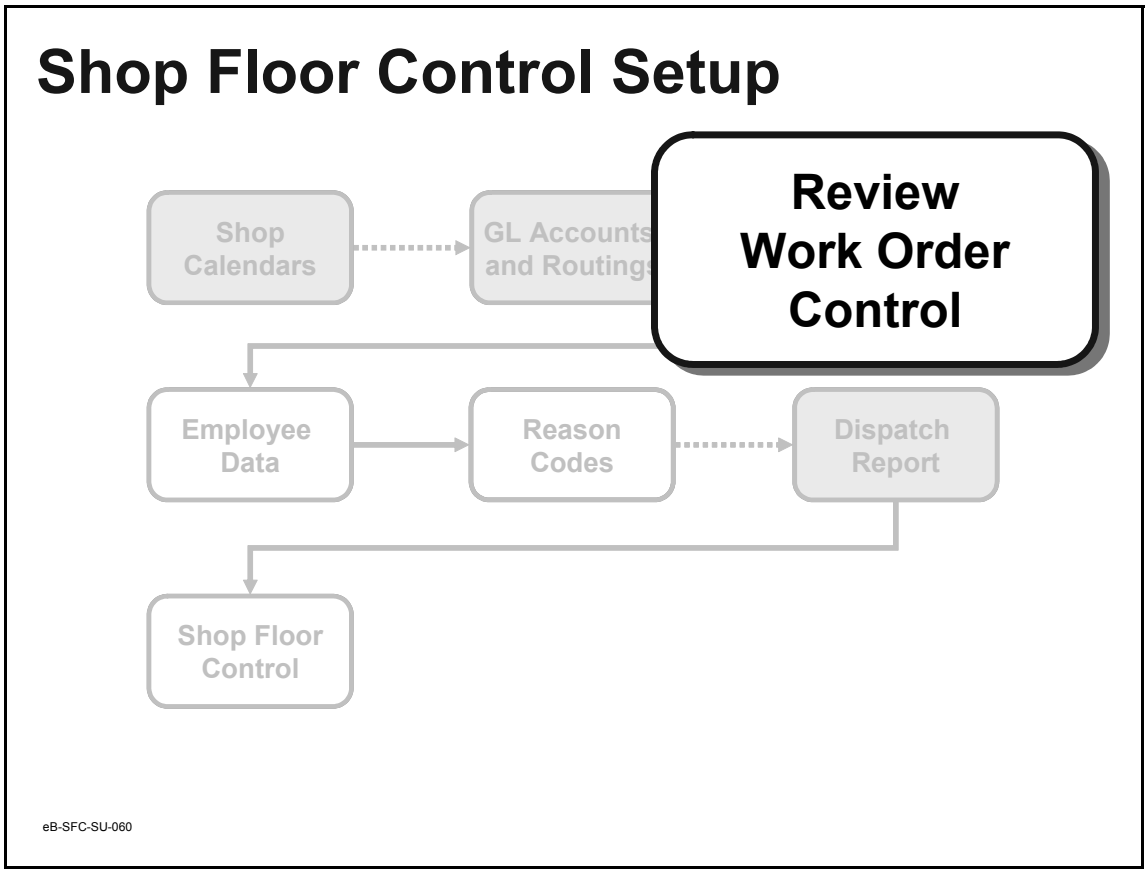


Review GL Accounts and Routings

Labor reporting relies on accurate standard operation times (setup, run, and lead time) and costs (labor, burden, and subcontract) from routings definitions. For this reason, it is good to check the:

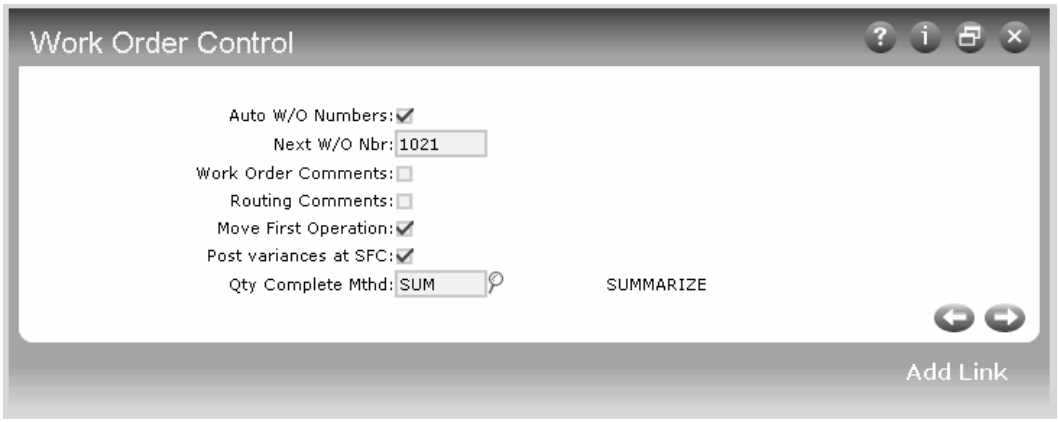
- For each department, review the GL accounts used for posting labor-related costs in Department Maintenance. (For product lines, review GL accounts in Product Line Maintenance)
- For each work center, review the queue time, wait time, and machines per operation, as well as the labor and burden costs in Work Center Maintenance
- Review each routing definition in Routing Maintenance

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



Review Work Order Control

Work Order Control



eB-SFC-SU-070

Work Order Control

Routing Comments

Indicates whether comments are normally entered for each routing operation. The setting of this flag does not control whether comments can be entered. It determines the default displayed.

- Setting this flag to Yes causes the operation comment flag to default to Yes. When the comment flag on an operation is set to Yes, the transaction comment screen displays for the user to enter comment text.

Move First Operation

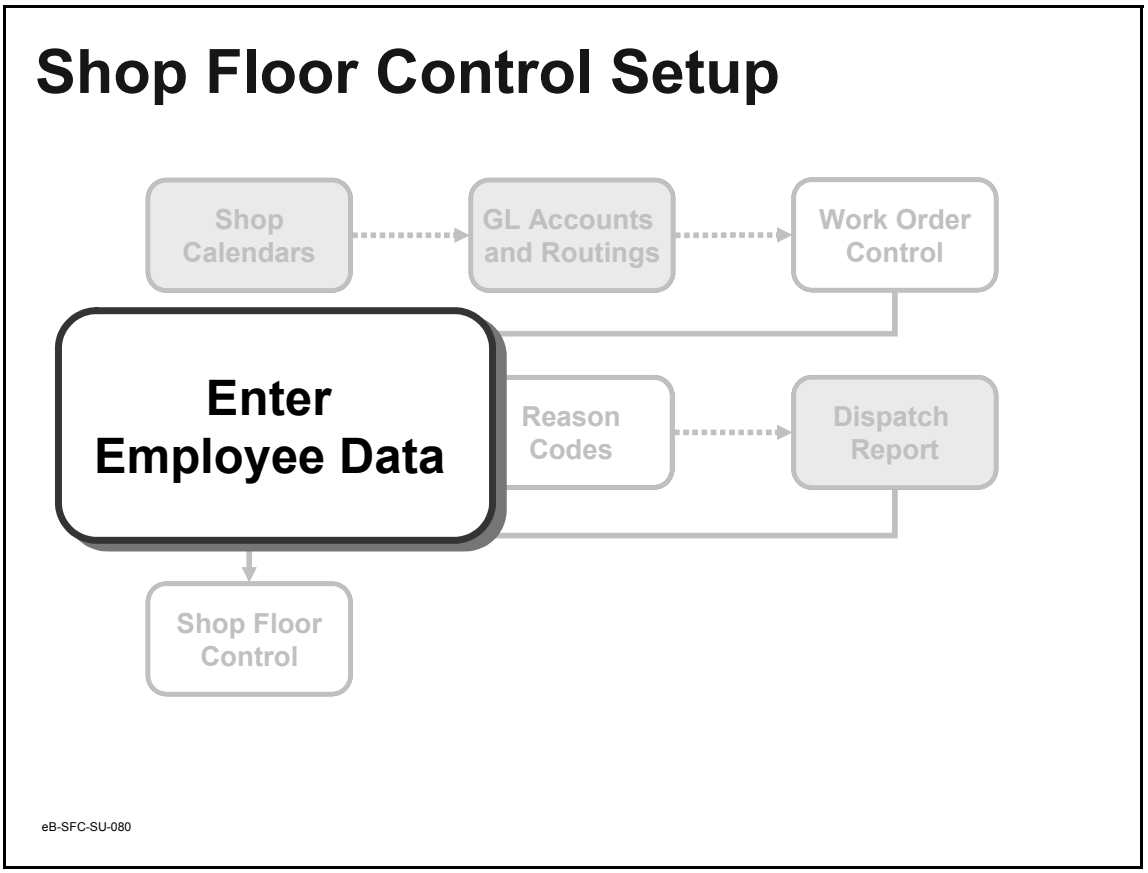
Indicates whether the work order release function should set the status of the first operation to [Q]ueue.

- Yes sets the status for the first operation to Queue upon work order release.
- Sometimes this may not be appropriate. If there is a lengthy picking effort required, the work order may not be ready as soon as it is released. In that case, set this flag to No. Once the picking is complete, use the Operation Move function to change the status to [Q]ueue.

Post Variances at SFC

Indicates whether variances are only calculated and posted at the time of work order receipt.

- Yes processes variances when labor is entered in SFC. No holds labor, burden, and usage variances until work order receipt.
- Setting this flag to No will reduce the number of GL transactions created if there are many shop floor labor transactions processed before material receipts are recorded.
- If you have very long run times, or if you are using SFC employee efficiency reports, you may want to set this flag to No, suppressing variance calculations until finished product is received.



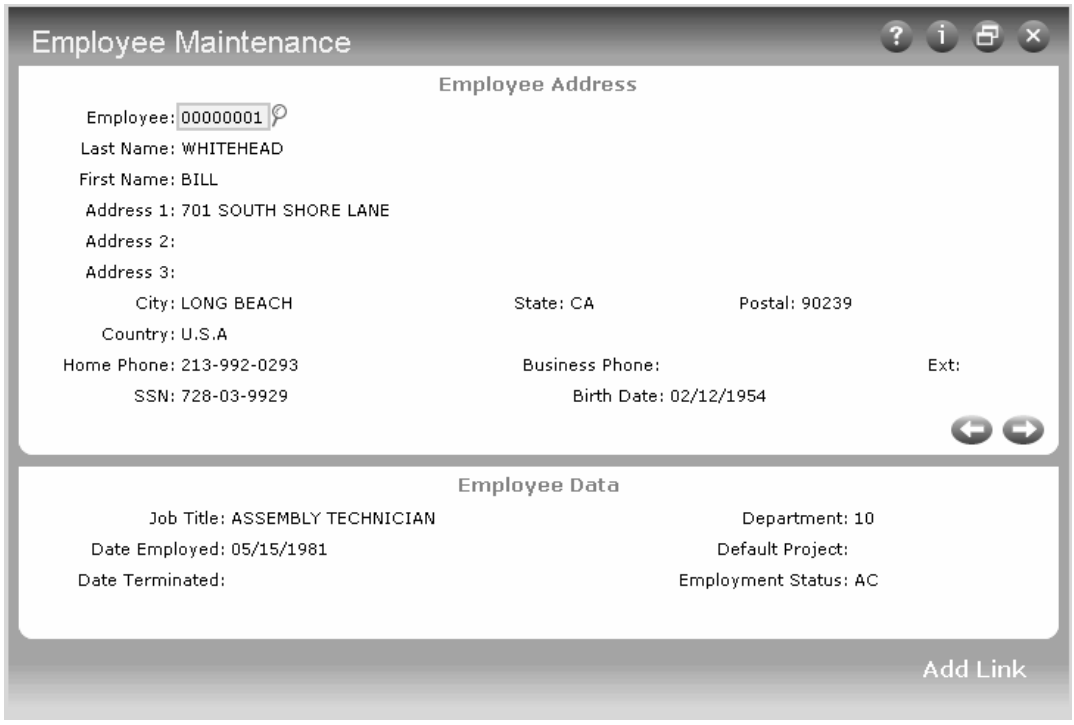
Enter Employee Data

Employee Maintenance establishes the default department, project, and work location for employee labor reporting. The user may override these defaults on any labor feedback transaction.

To use SFC, you must enter at least one employee record.

- If you are using SFC to record operation transactions and not labor for individual employees, create a pseudo employee and record all time, operation moves, and completions against it.
- If you are recording labor by employee, enter the appropriate information in Employee Maintenance. Be sure to assign the correct department and ensure that the Employment Status is set to Active.

Employee Maintenance



eB-SFC-SU-090

Employee Maintenance

Employment Status

A code identifying the employment status of this employee. Values may be:

- AC (active)
- LA (leave of absence)
- PT (part time)
- TR (terminated).

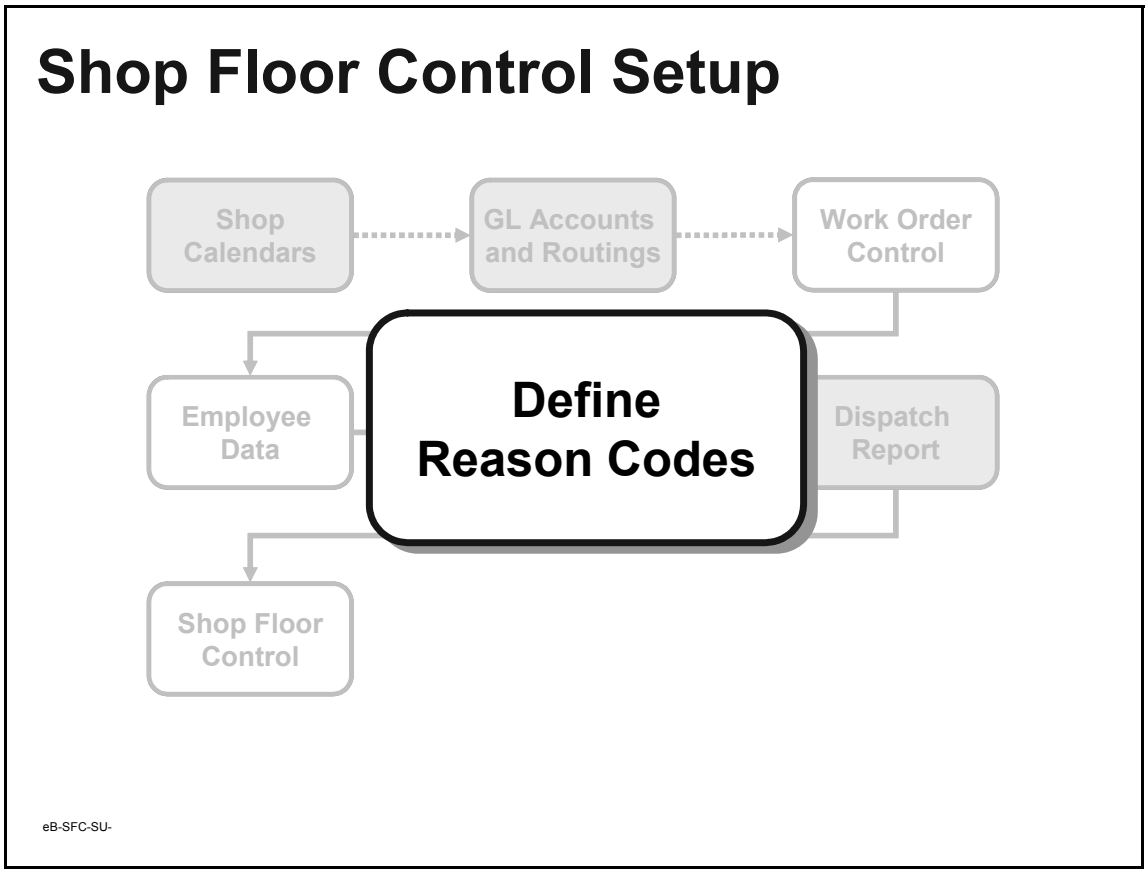
Check that the Employment Status field is set to AC (active).

Department

The department in which this employee normally works. This department links labor and downtime reported for this employee to the correct GL accounts.

– This field is a default useful for reviewing employees by department

Discussed in the following Training Guide: Initial MFG/PRO eB Setup



Define Reason Codes

In SFC, down time can be recorded and reported by reason code. The following screens use reason codes.

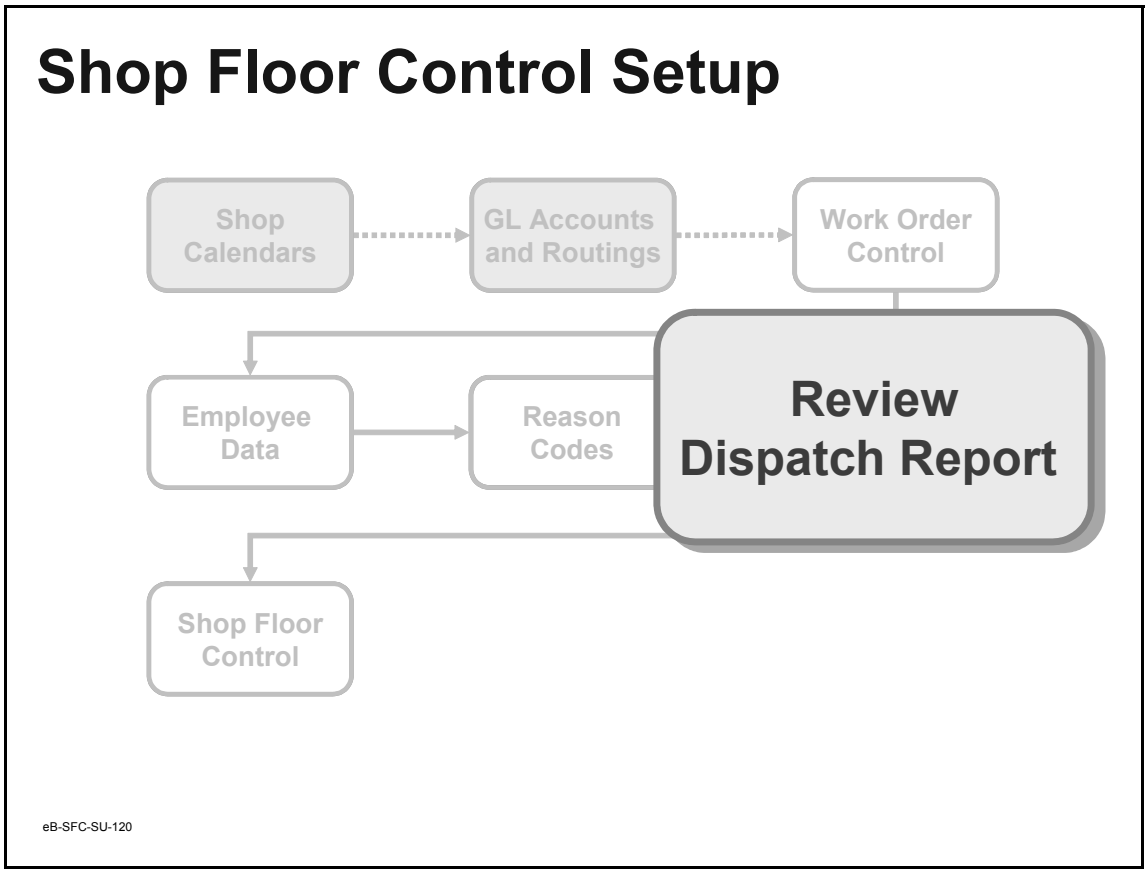
- Labor Feedback – Down Time, Rejects and Rework fields
- Non-Productive Labor

Reason Codes Maintenance

eB-SFC-SU-110

Reason Codes Maintenance

Reason codes are set up in Reason Codes Maintenance. For example, reason type DOWN might include reason code 1 for preventive maintenance, 2 for company-wide meeting, and so on.

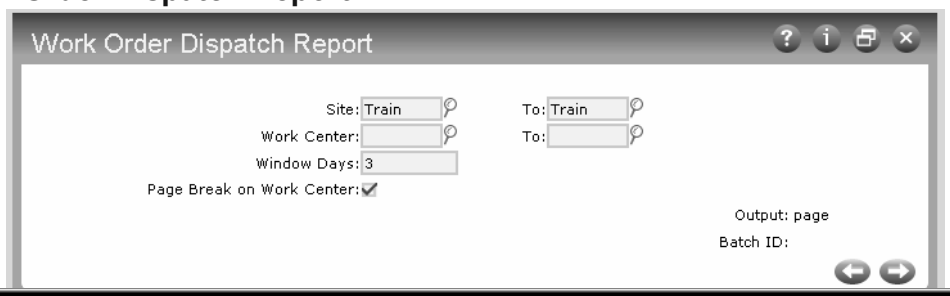


Review Dispatch Report

The Dispatch Report identifies work orders that will be arriving at a work center as well as those work orders already there. This information is useful in determining the work center's anticipated load and assists the dispatcher or production supervisor in establishing priorities for the orders. These lists are printed daily and are used to schedule work.

In MFG/PRO eB, the dispatch report includes all scheduled operations for a work center or machine. The operations are listed in ascending sequence by scheduled start date. The report usually includes all past due operations and those due to begin work within a user-specified time period. The specified period of time is established in the Window Days option prior to running the Work Order Dispatch Report.

Work Order Dispatch Report



woworp04.p b+ 16.18 Work Order Dispatch Report Date: 06/06/03
Page: 1 MFG/PRO Training DB - eB 92 Time: 14:35:00

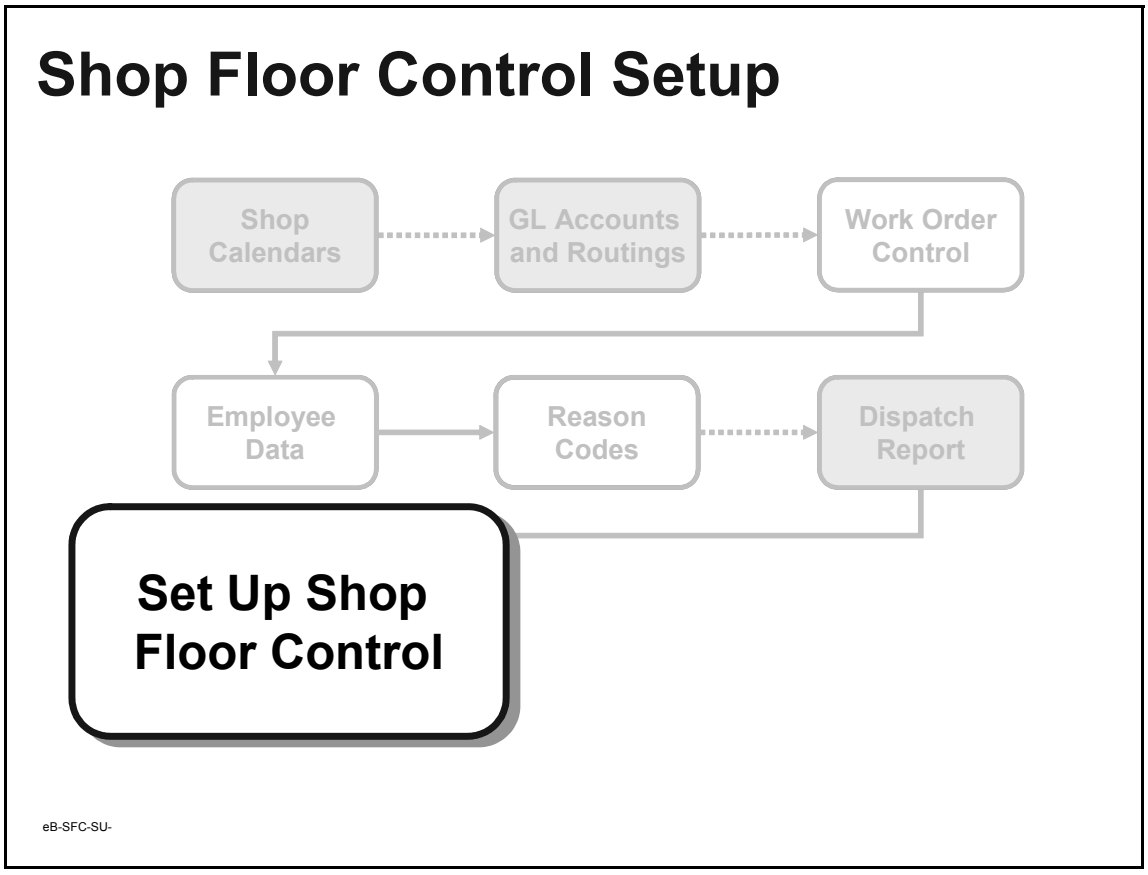
Work Center: 1020 Machine: BLISTER PACK Site: train

Item Number	Work Order	Operation	Start	Due Date	Std Setup	Std Run Time	Open Qty	St
02-0005	1007	10	05/27/03	06/04/03	1.0	50.0	10,000.0	Q
MECHANICAL PENCIL (5MM) BLISTER PACKED	ID: 16	BLISTER PACK						
02-0005	1008	10	06/03/03	06/04/03	1.0	10.0	2,000.0	
MECHANICAL PENCIL (5MM) BLISTER PACKED	ID: 19	BLISTER PACK						
02-0005	1009	10	06/03/03	06/04/03	1.0	12.5	2,500.0	Q
MECHANICAL PENCIL (5MM) BLISTER PACKED	ID: 21	BLISTER PACK						
02-0005	1010	10	06/05/03	06/05/03	1.0	0.5	100.0	Q
MECHANICAL PENCIL (5MM) BLISTER PACKED	ID: 24	BLISTER PACK						
02-0005	1011	10	06/05/03	06/05/03	1.0	1.25	250.0	Q
MECHANICAL PENCIL (5MM) BLISTER PACKED	ID: 29	BLISTER PACK						
02-0005	1017	10	06/09/03	06/09/03	1.0	0.5	100.0	
MECHANICAL PENCIL (5MM) BLISTER PACKED	ID: 39	BLISTER PACK						

eB-SFC-SU-

Work Order Dispatch Report

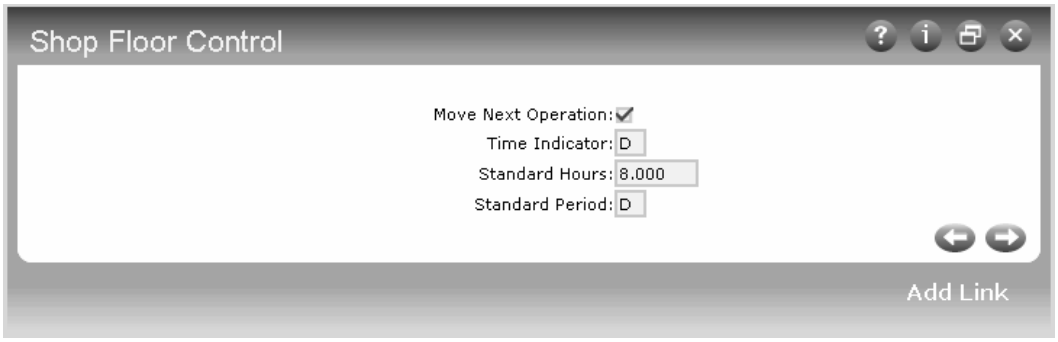
Discussed in the following Training Guide: Work Orders



Set Up Shop Floor Control

The format of the labor feedback data is controlled by the Shop Floor Control.

Shop Floor Control



eB-SFC-SU-150

Shop Floor Control

Move Next Operation

If Yes, when an operation is reported as completed, the system will automatically move the work order to the next operation with status of Queue.

Time Indicator

Identifies how labor hours are normally reported. If set to D, labor time is entered in decimal hours; if set to H, labor time is entered in hours:minutes:seconds.

– If you are using a shop floor data collection system, set this flag based on the type of output that system produces

Standard Hours

This field shows the number of hours per period. Used to determine when labor hours represent overtime.

Standard Period

A code identifying the standard work period. The period may be day [D] or week [W].

Course Overview

- ✓ Introduction to Shop Floor Control
- ✓ Business Considerations
- ✓ Set up Shop Floor Control
- ♦ Use Shop Floor Control

eBSFC-SU-160

CHAPTER 4

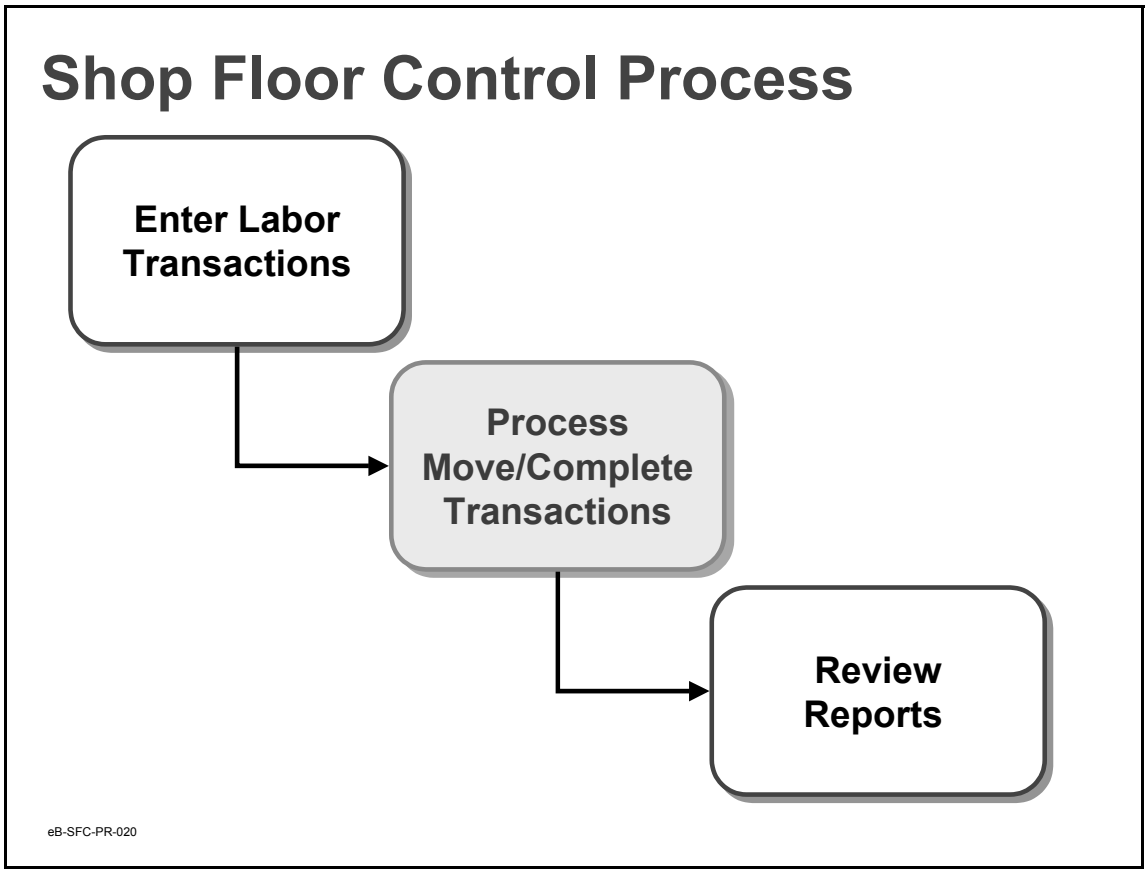
Use Shop Floor Control

Use Shop Floor Control

In this section you learn how to:

- ✓ Identify some key business considerations before setting up Shop Floor Control in MFG/PRO
- ✓ Set up Shop Floor Control in MFG/PRO
- ✓ **Use Shop Floor Control in MFG/PRO**

eB-SFC-PR-010



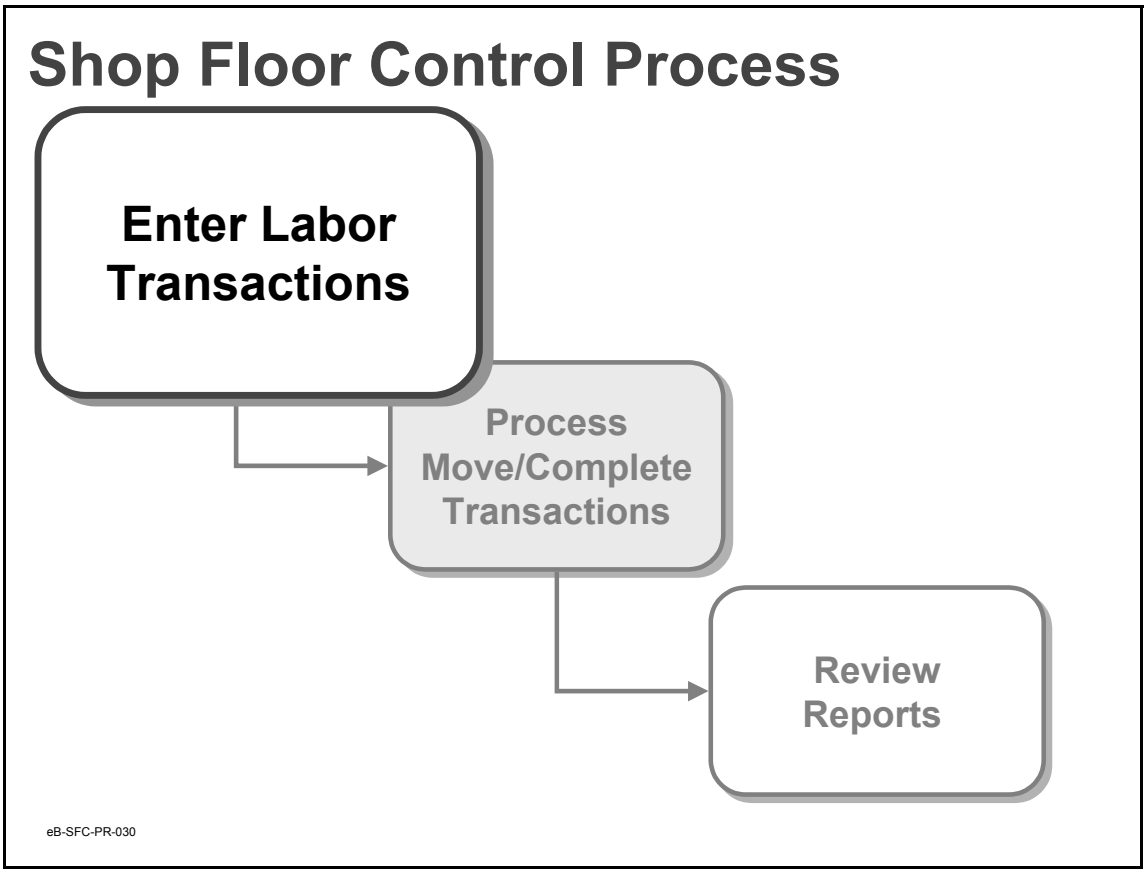
Shop Floor Control Process

When processing work orders in Shop Floor Control, use Work Order Routing Inquiry/Browse to quickly view work order details such as item number, operation, description, work center, machine, quantity ordered, quantity complete, and start date.

Reading the illustration:

Boxes with solid lines are required to use Shop Floor Control and are covered in this course

Shaded boxes reflect optional steps, but are covered in this course

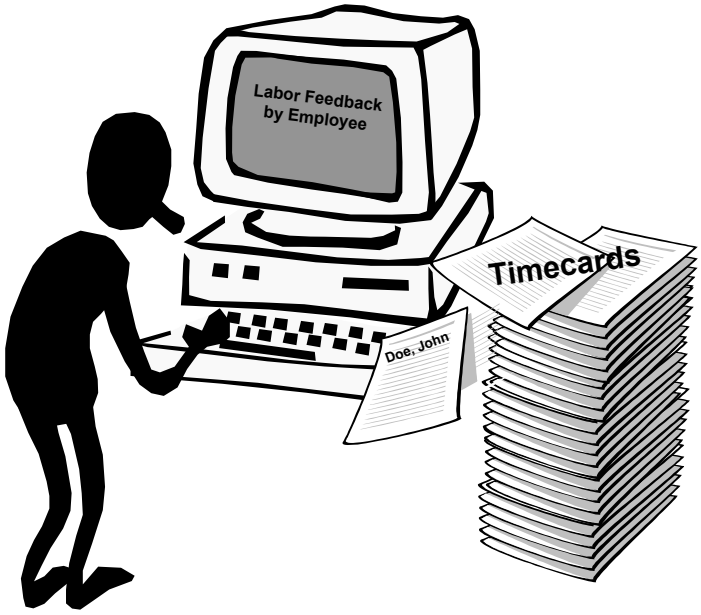


Enter Labor Transactions

Labor transactions report the movement of an order from one operation to another and record the quantity completed and rejected at each operation.

- Labor reporting relies on accurate standard operation times and costs from the routing definitions
- Labor is reported by:
  - Employee,
  - Work order, or
  - Work center

Labor Transactions by Employee

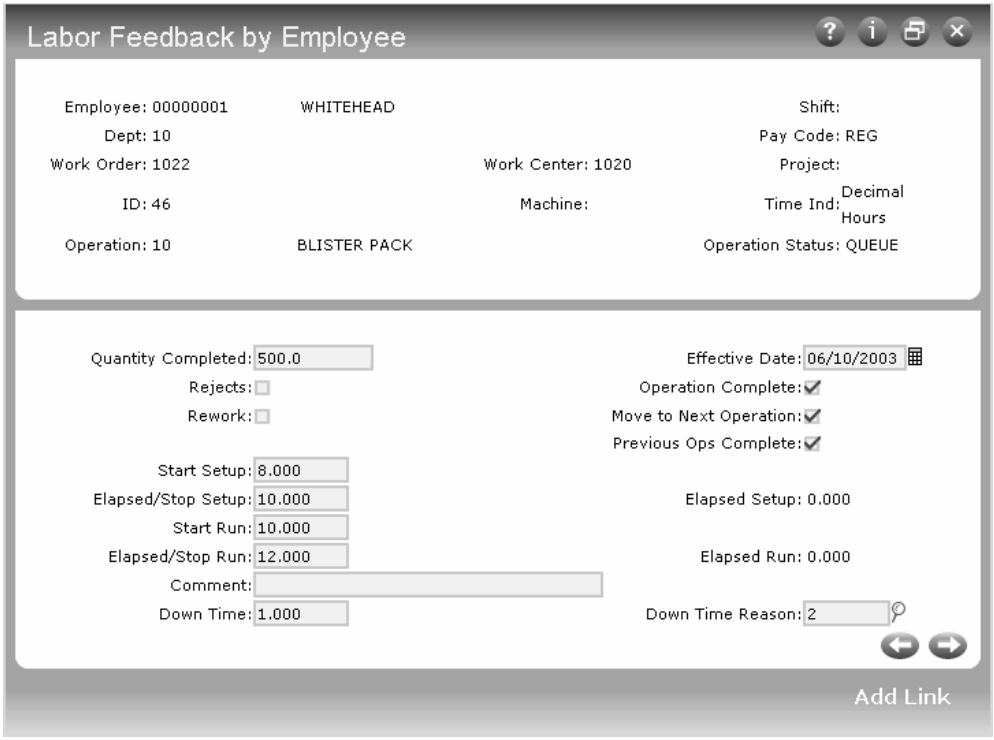


eB-SFC-PR-040

Each of the three labor feedback transaction screens – by work order, by employee, and by work center – has the same fields and collects the same information, but in different order.

- For data entry purposes, you may find that one Labor Feedback Transaction screen is easier and faster to use than another

Labor Feedback by Employee



eB-SFC-PR-050

Labor Feedback Transactions

Use Labor Feedback by Work Order, by Employee, or by Work Center to enter actual labor. By default, this reports an operation as completed and moves the work order to the next operation on the routing. All three Labor Feedback screens contain the same information, only the order of the fields is different for data entry purposes.

Employee

An employee code must be entered. It is not necessary for this code to correspond to an actual person. A single employee code can be set up and used only for reporting purposes.

Department

The default department code is determined by the work order routing. The system creates GL transactions using the accounts associated with the department code.

Work Center

The default work center code is also determined by the work order routing. The work center setup, run, and burden rates are used by the system when it calculates costs and creates GL transactions.

Project

A project field is available for expense tracking by project.

Operation Complete, Move Next Operation, Previous Ops Complete

- An operation is set to Complete status automatically during labor feedback transactions. This status change occurs when the work order quantity is finished at the current operation and the Move Next Operation and Operation Complete fields are set to Yes.
- The defaults are Yes for Operation Complete, Move Next Operation, and Previous Ops Complete. The Move to Next Operation default setting can be changed in the Shop Floor Control File.

Quantity Completed

The quantity completed is the number of good units produced. It is used in calculations for variances, work center efficiency, and GL transactions.

Rejects

The quantity rejected is the number of nonconforming units produced that cannot be moved to the next operation. It is not used for calculating variances, work center efficiency, or GL transactions.

If the quantity rejected is going to reduce the expected receipt quantity significantly, then use Work Order Maintenance to reduce the order quantity to the expected quantity so that MRP can review and plan for this shortfall. Burden will be applied to all down-time hours entered here. This down time is not associated with the work order in MFG/PRO.

Rework

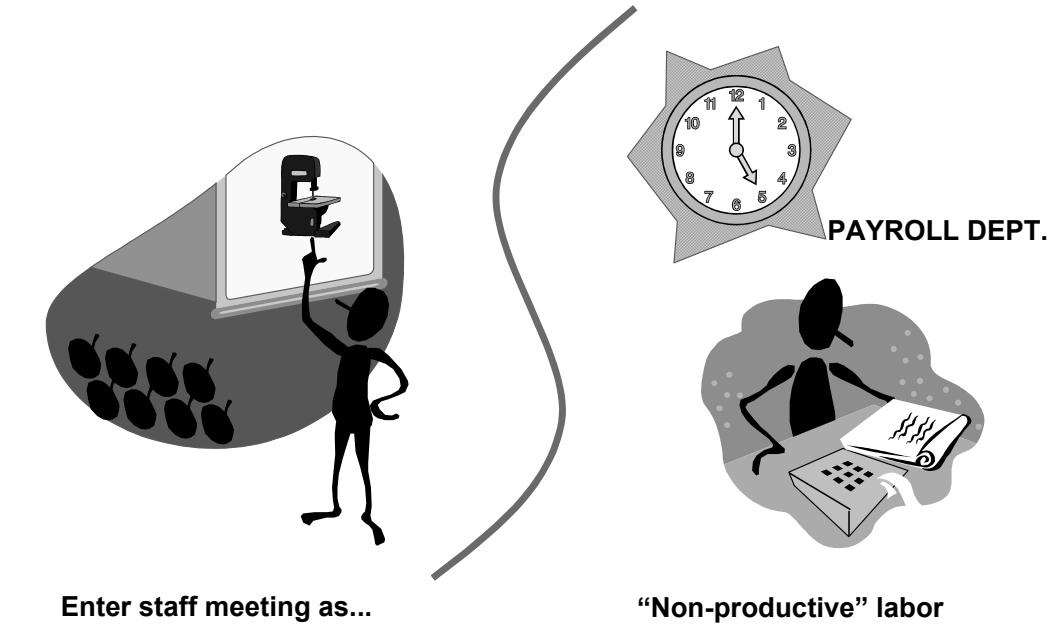
The quantity reworked is the number of unacceptable units requiring additional processing. It is not necessary that all of these result in good units that can be moved to the next operation. Like the quantity rejected, it is not used for calculating variances, work center efficiency, or GL transactions.

Start Setup, Elapsed/Stop Setup, Start Run, Elapsed/Stop Run

When entering labor time, enter either the start and stop times or the elapsed labor time. Time may be reported in either decimal or in hour/mins. format. The format can be specified on each labor reporting transaction; however, a default is set up in the Shop Floor Control File.

Down Time

Non-productive labor can be entered with the reason code assigned to this down time. Down time is entered in elapsed time.

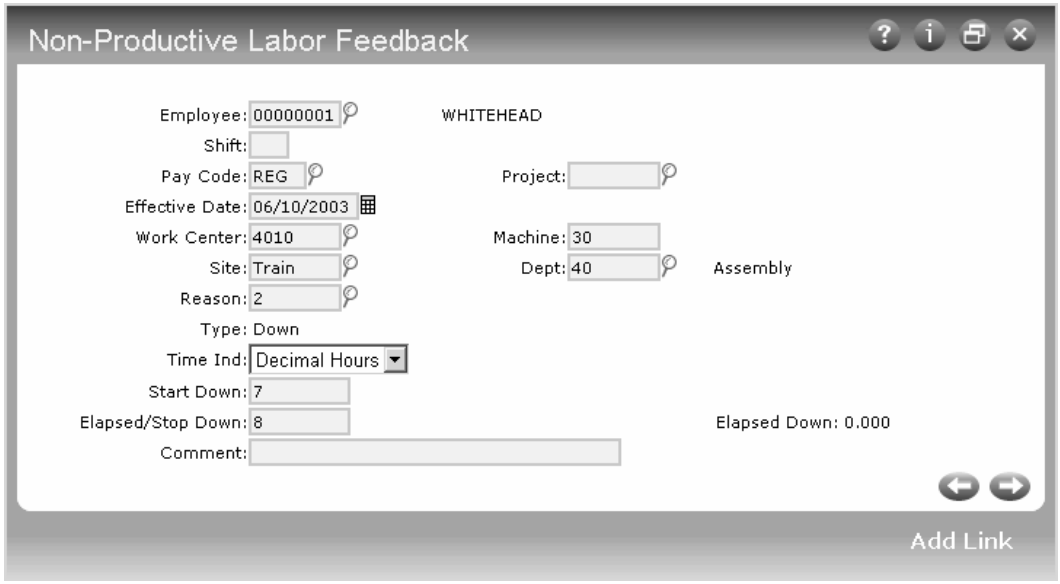


Enter Non-Productive Labor Feedback Transactions

Use Non-Productive Labor Feedback to enter indirect labor time for such activities as preventive maintenance, machine breakdown, waiting for work, repairing tools, cleaning, and meetings.

Indirect labor transactions are important if SFC labor reporting is used for payroll purposes–when it is necessary to account for all of an employee’s time–and for efficiency and utilization reports.

Non-Productive Labor Feedback

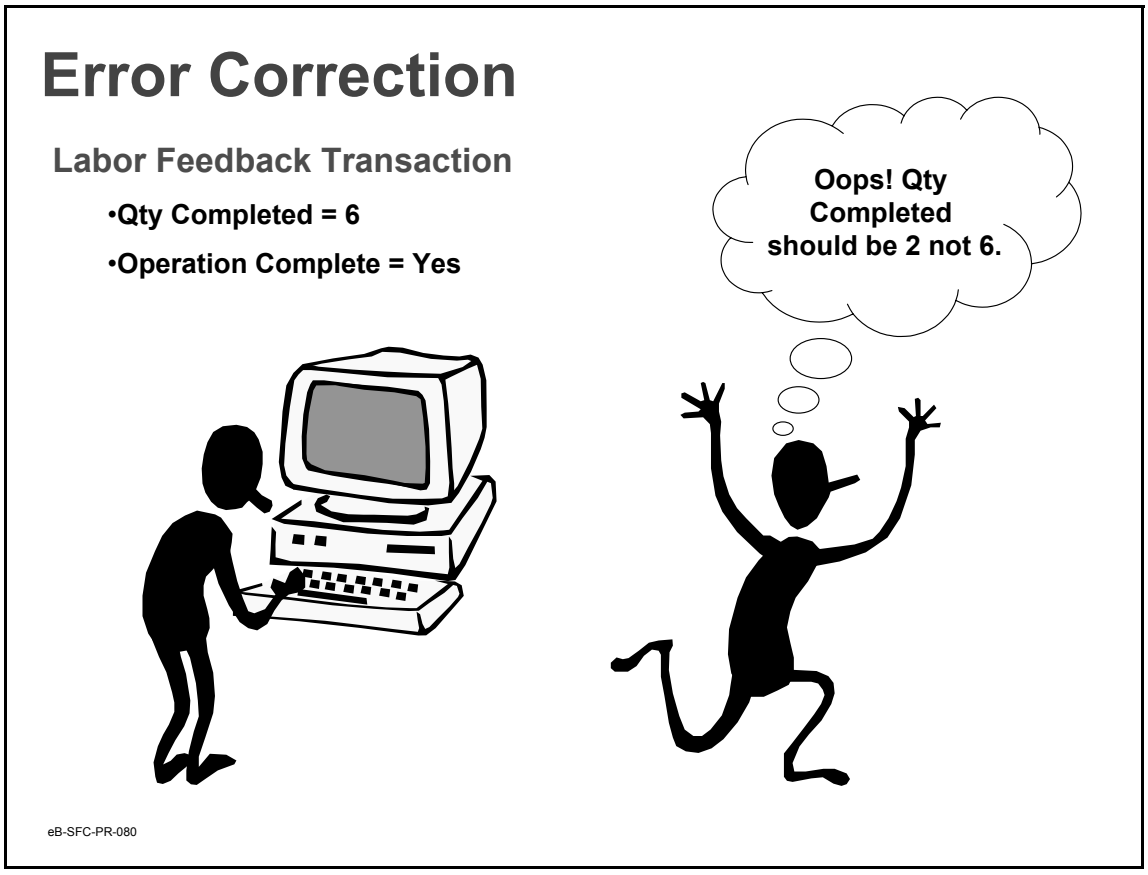


eB-SFC-PR-070

Non-Productive Labor Feedback

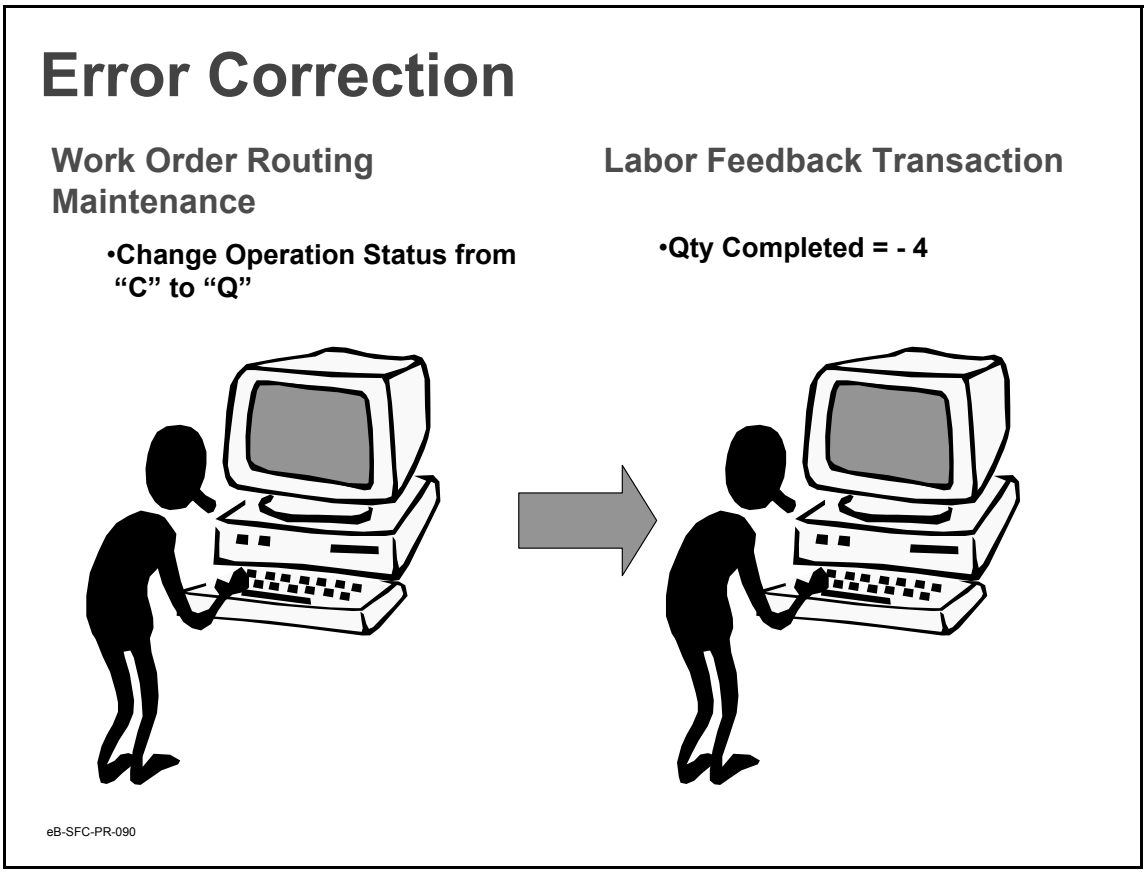
Reason

Non-productive labor feedback transactions reference reason codes set up in Reason Codes Maintenance with a reason type of Down. Shop floor reports use this information to calculate utilization and efficiency.



Error Correction

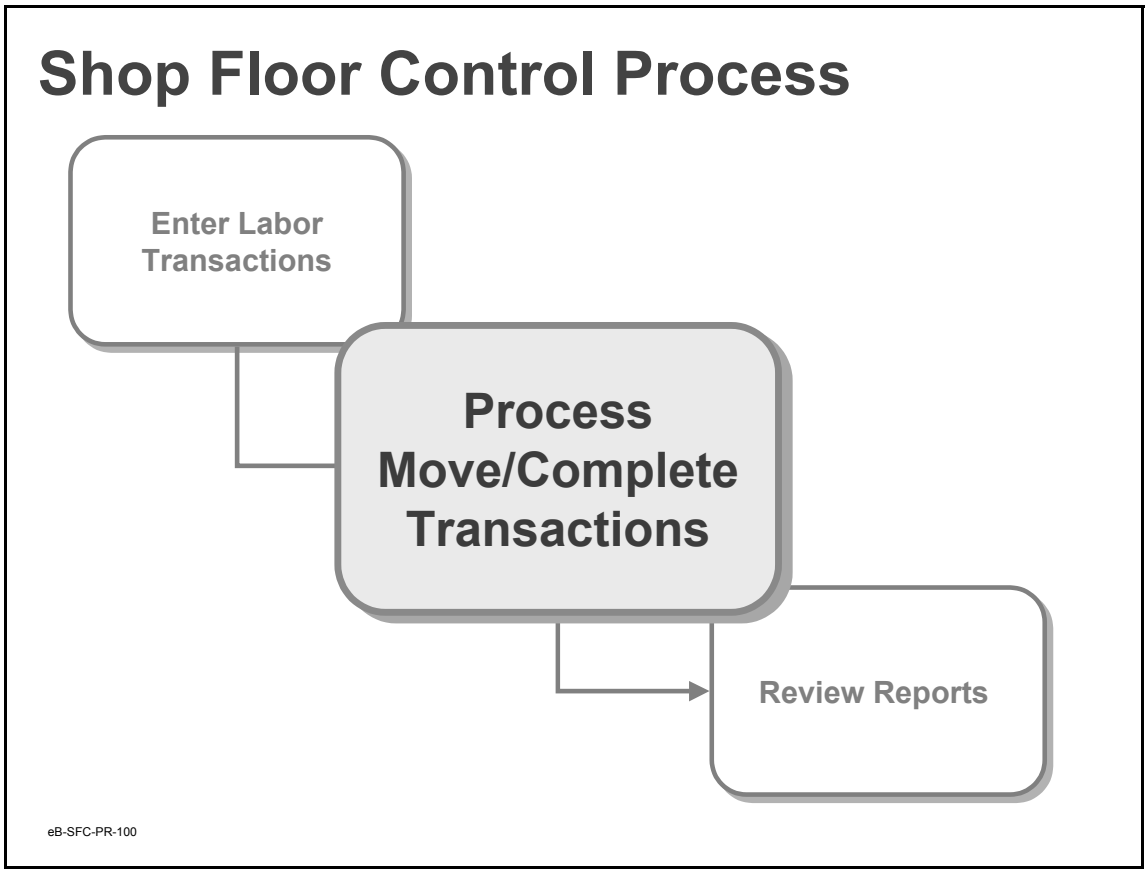
Operations that have been processed as complete in Labor Feedback transactions may not be directly modified or deleted. However, you can re-enter a second transaction with a negative value to reverse the effect of the incorrect transaction.



To make a correction:

- If the work order is still open, change the status of the operation from Complete to Queue in Work Order Routing Maintenance.
- In Labor Feedback, enter a negative quantity or negative elapsed time, depending upon the error, to reverse the effect of an incorrect transaction

If the work order is closed, reopen the work order in Work Order Maintenance first, then follow the steps above.

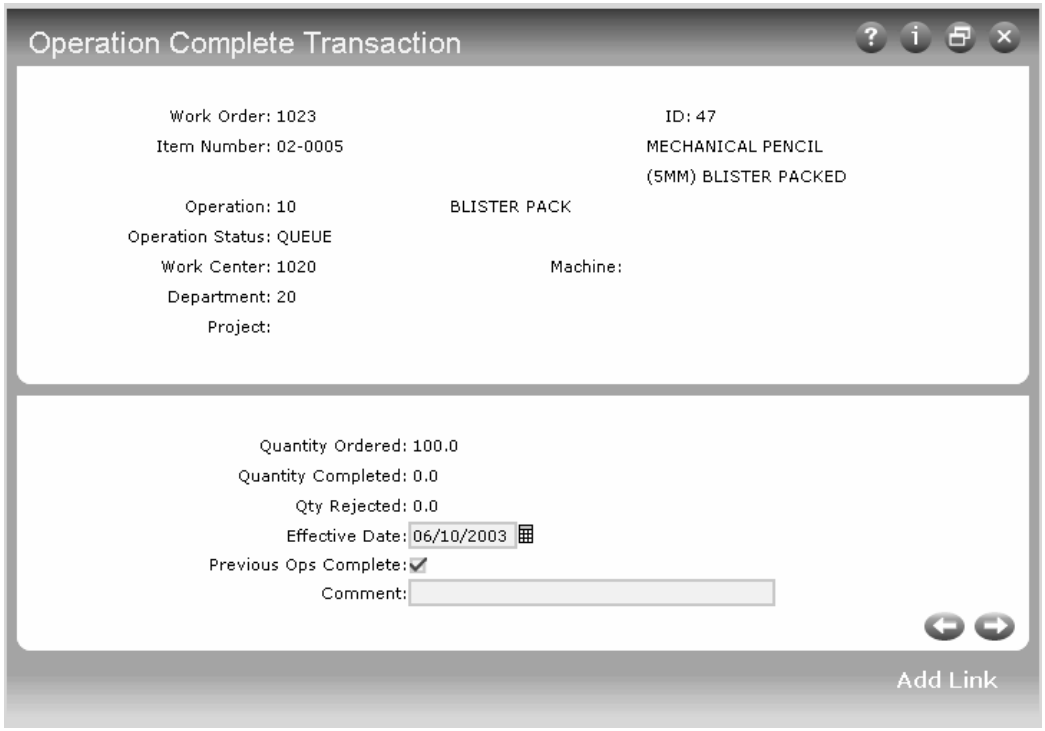


Process Move/Complete Transactions

The Operation Move Transaction and Operation Complete Transaction provide additional control over the movement of orders from operation to operation. These transactions would typically be used for:

- Error correction
- Quality control checkpoints
- Control of work center queues

Operation Complete Transaction



eB-SFC-PR-110

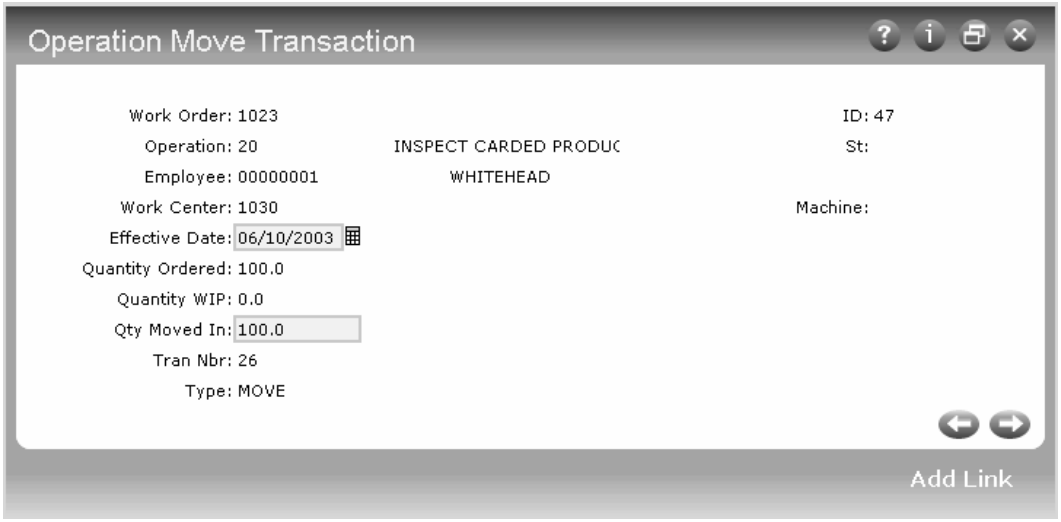
Operation Complete Transaction

Operation Complete Transaction is an alternative way to close an operation. Current operations and all preceding open operations can also be closed in Labor Feedback.

Note In Operation Complete Transaction, you cannot enter the quantity completed. The quantity completed for a given operation must be entered in one of the Labor Feedback transaction screens.

Current and previous operations are closed in Operation Complete Transaction only with the quantity accepted in Labor transactions.

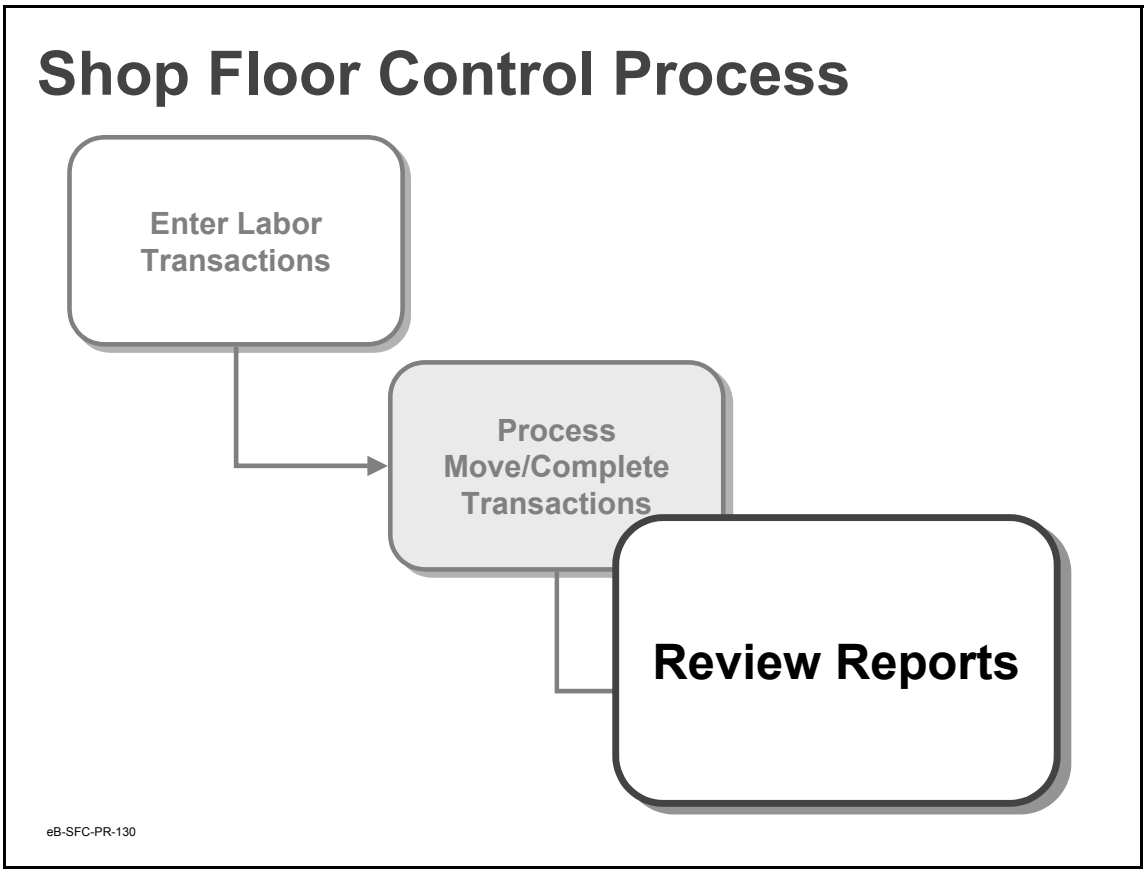
Operation Move Transaction



eB-SFC-PR-120

Operation Move Transaction

Operation Move Transaction moves an order to an operation and facilitates manual control of work center queues.

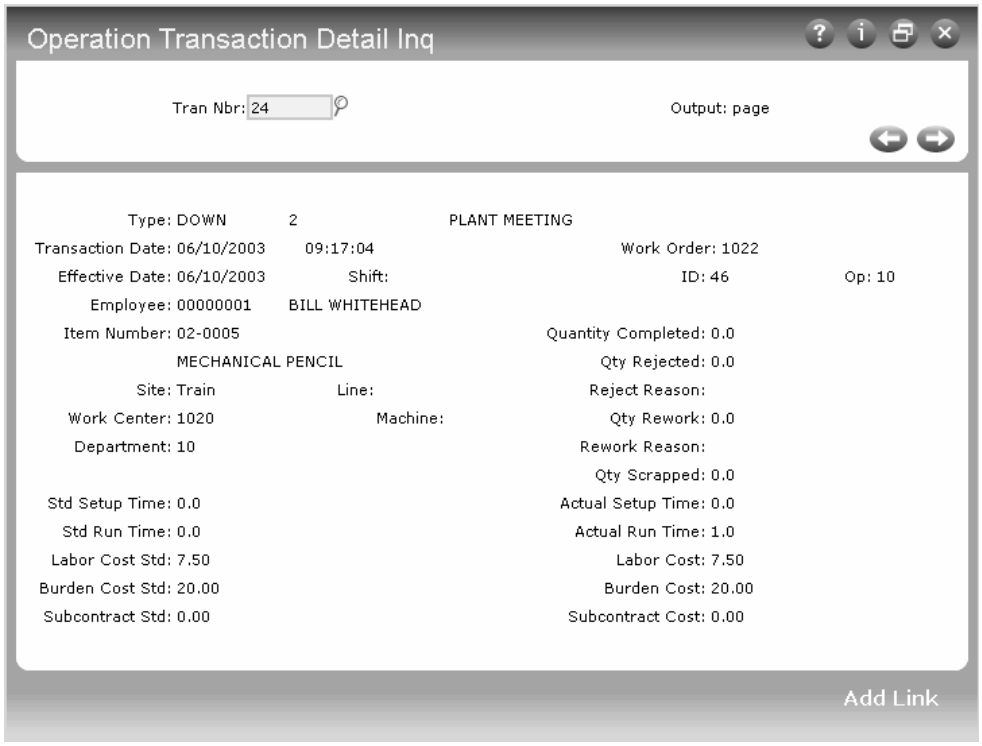


Review Reports

Reports are a key output of shop floor control, which produces labor reporting that can be divided into several categories:

- Transactions
- Down time
- Input/output
- Utilization and efficiency

Operation Transaction Detail Inquiry



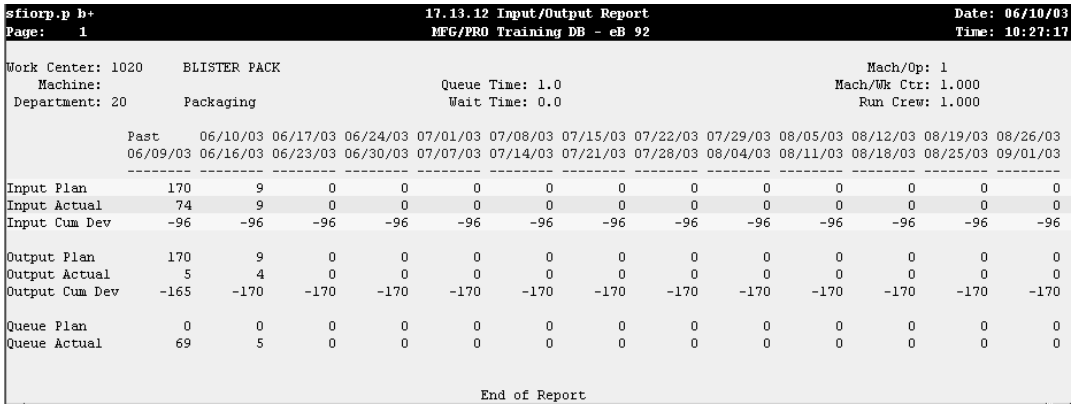
eB-SFC-PR-140

Operation Transaction Detail Inquiry

The system creates transactions when using the functions that record labor feedback, non-productive labor, down time, and the completion of operations. The data from these transactions can be reported by:

- Work center,
- Work order, or
- Employee

Input/Output Report



```
sfiorp.p b+                          17.13.12 Input/Output Report                    Date: 06/10/03
Page:    1                            MFG/PRO Training DB - eB 92                    Time: 10:27:17

Work Center: 1020     BLISTER PACK                                                    Mach/Op: 1
    Machine:                                    Queue Time: 1.0                     Mach/Wk Ctr: 1.000
 Department: 20       Packaging                 Wait Time: 0.0                        Run Crew: 1.000

              Past     06/10/03 06/17/03 06/24/03 07/01/03 07/08/03 07/15/03 07/22/03 07/29/03 08/05/03 08/12/03 08/19/03 08/26/03
              06/09/03 06/16/03 06/23/03 06/30/03 07/07/03 07/14/03 07/21/03 07/28/03 08/04/03 08/11/03 08/18/03 08/25/03 09/01/03
              -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- -------- --------
Input Plan         170        9        0        0        0        0        0        0        0        0        0        0        0
Input Actual        74        9        0        0        0        0        0        0        0        0        0        0        0
Input Cum Dev      -96      -96      -96      -96      -96      -96      -96      -96      -96      -96      -96      -96      -96

Output Plan        170        9        0        0        0        0        0        0        0        0        0        0        0
Output Actual        5        4        0        0        0        0        0        0        0        0        0        0        0
Output Cum Dev    -165     -170     -170     -170     -170     -170     -170     -170     -170     -170     -170     -170     -170

Queue Plan           0        0        0        0        0        0        0        0        0        0        0        0        0
Queue Actual        69        5        0        0        0        0        0        0        0        0        0        0        0


                                                    End of Report
```

eB-SFC-PR-150

Input/Output Report

The Input/Output Report is one of the primary tools for monitoring the load at work centers and finding bottlenecks. It allows a manager to compare planned input and output at a work center with actual input and output, by time period. These reports calculate planned input and output from the work order operations based on their start dates, standard setup and run times, and the shop/work center calendar. Actual input and output are obtained from the operation history transactions; the quantities moved to a work center are used to determine input and the quantities completed at a work center for output.

You can display planned and actual input and output in daily, weekly, or monthly periods.

Planned Input

Planned input is load on a work center or machine represented by work order operations scheduled to start in a reporting period.

It is determined using the following calculation:

```
Standard Setup + (Standard Run × Quantity Ordered)
```

Actual Input

Actual input is load that has been moved to the first and subsequent order operations. It is calculated for a reporting period based on move transactions entered using work order release and shop floor control functions.

Actual input is determined using the following calculation:

```
Standard Setup + (Standard Run Hours × Quantity Moved)
```

Planned Output

Planned output is load calculated based on order operations scheduled to be completed in a reporting period.

It is determined by using the following calculation:

```
Standard Setup + (Standard Run × Quantity Ordered)
```

Actual Output

Actual output is load calculated for a reporting period based on operation quantity completed transactions for work orders and repetitive schedules. You can report completed quantities for order operations using labor feedback transactions in the Shop Floor Control.

Actual output is determined using the following calculation:

```
Actual Setup + (Standard Run × Quantity Completed)
```

Planned Queue

The difference between planned input and planned output.

Actual Queue

The difference between actual input and actual output.

Down Time Report

Use Down Time Report to produce a report on down time by:

- Site,
- Work center,
- Machine,
- Employee,
- Effective date,
- Work order, or
- Work order ID number.

Work Center Utilization Report

sfwcrp04.p b+ 17.13.18 Work Center Utilization Report Date: 06/10/03
Page: 1 MFG/PRO Training DB - eB 92 Time: 10:30:12

Site	Dept	Work Ctr	Machine	Date	Capacity	Actual Hours	Util %
Train	20	1020		06/03/03	8.00	0.0	0.00%
Train	20	1020		06/04/03	8.00	0.0	0.00%
Train	20	1020		06/05/03	8.00	0.0	0.00%
Train	20	1020		06/06/03	8.00	3.25	40.63%
Train	20	1020		06/10/03	8.00	4.0	50.00%
			Total		40.00	7.25	18.13%
Train	22	FILL1		05/30/03	8.00	0.0	0.00%
			Total		8.00	0.0	0.00%
Train	30	1030		06/06/03	8.00	0.0	0.00%
Train	30	1030		06/10/03	8.00	0.0	0.00%
			Total		16.00	0.0	0.00%
train	40	4010	30	01/01/97	0.00	1.0	?
Train	40	4010	30	05/30/03	8.00	0.0	0.00%
			Total		8.00	1.0	12.50%

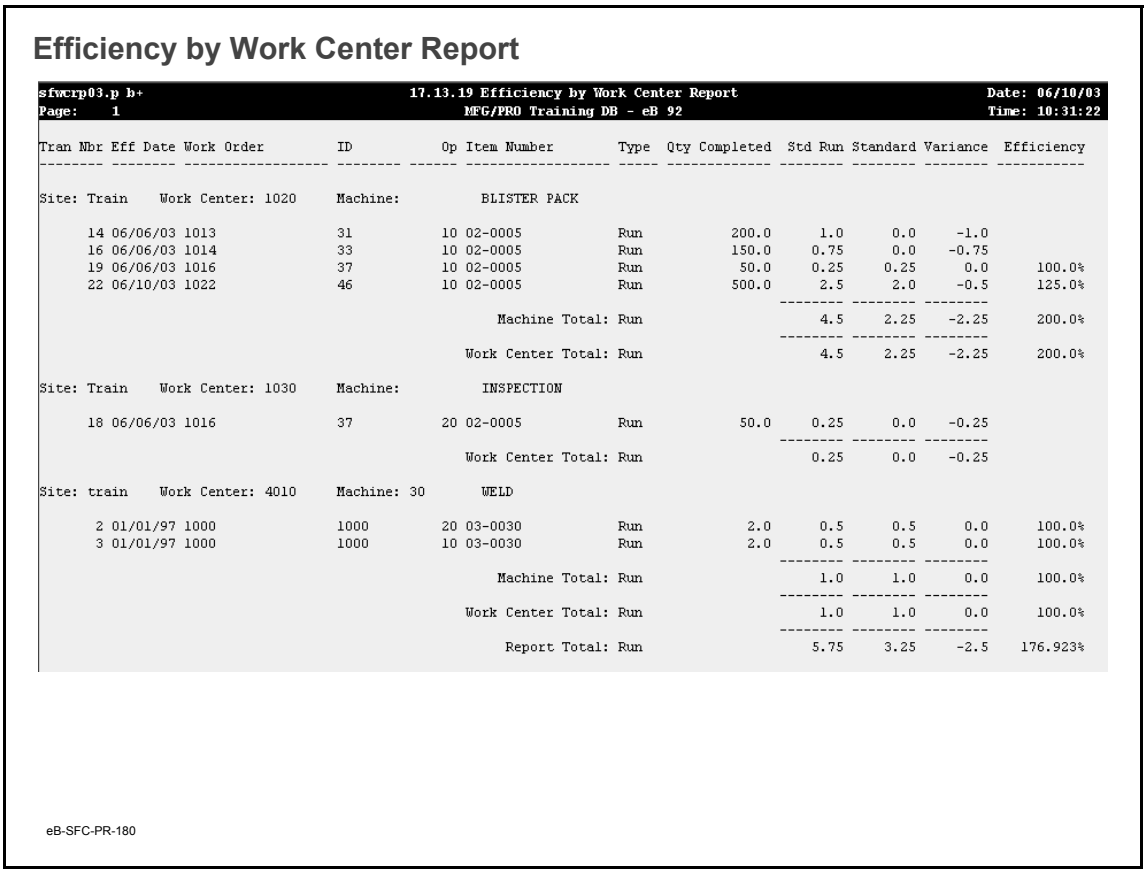
eB-SFC-PR-170

Work Center Utilization Report

Use Work Center Utilization Report to produce a report on work center or machine capacity utilization based on labor reporting. This report identifies bottlenecks or underused work centers and shows how the hours in the work day are being used.

The Work Center Utilization Report calculates work center or machine utilization by dividing the total number of hours worked (recorded through transactions) by the total number of hours available to be worked (as calculated from the shop calendar) and multiplying the result by 100.

Utilization is one of two key measures that managers use to measure performance.



Efficiency by Work Center Report

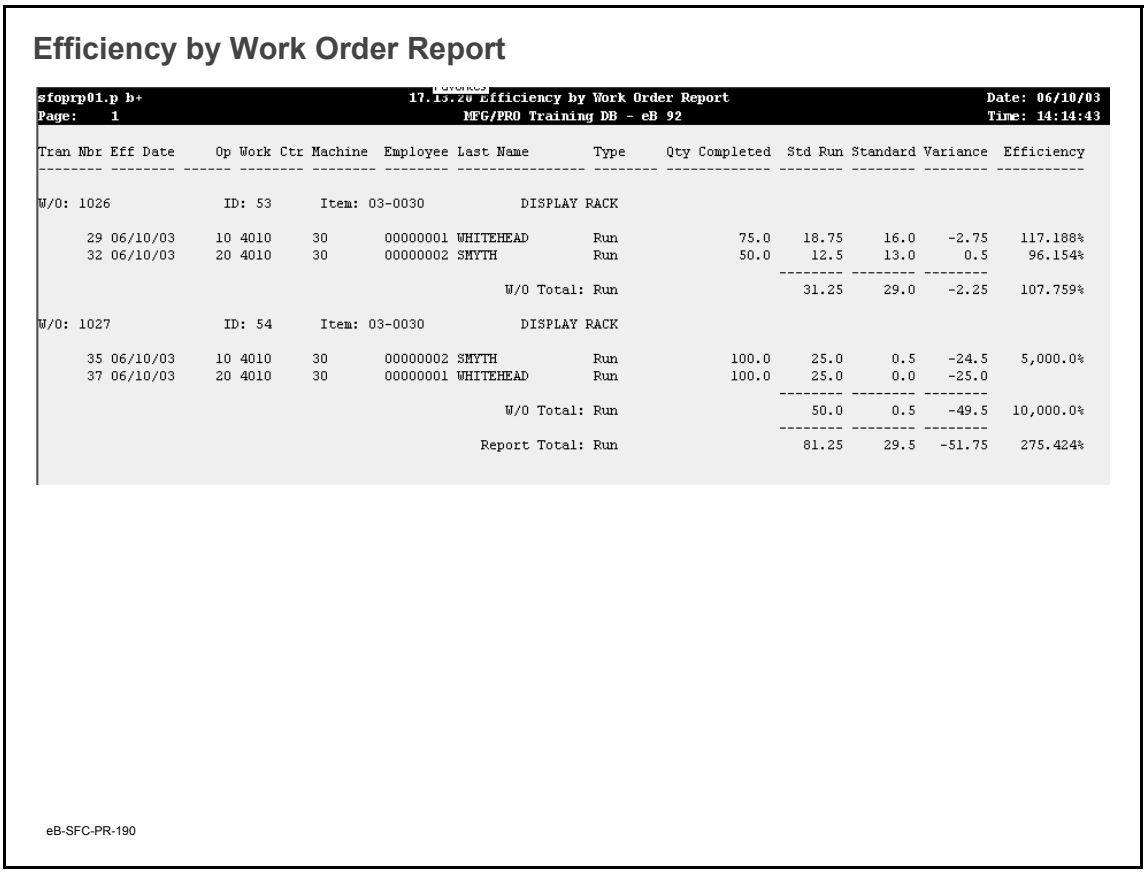
Efficiency reports help identify problems with routing standards and show how effectively labor is being used. Operation efficiencies are calculated by dividing the total number of standard hours earned (by completing units at operations) by the total number of hours worked and multiplying the result by 100. This data may be sorted by work order, work center or machine, or employee for any time period. Efficiency is one of two key measures that managers use to measure performance.

The Efficiency by Work Center Report lists the following in transaction sequence by work center:

- Transaction number and date
- Work order number
- Operation
- Employee number and name

- Labor type (setup or run)
- Quantity completed
- Standard, actual and variance hours
- Setup and run efficiency percentages

Setup and run totals are provided by work center or machine.



Efficiency by Work Order Report

Efficiency by Work Order Report shows, by ascending work order number, setup and run information by operation. It lists the following:

- Work order item number and description
- Quantity:
  - Ordered Open
  - In WIP Completed
  - Rejected Reworked
- Work order status
- Actual setup and run hours

- Standard setup and run hours
- Setup and run variance hours
- Setup and run efficiency in percentages

Shop Floor Control Exercises

eB-SFC-PR-200

Exercise: Operation Scheduling

There are two sets of dates generated and used by the system: (1) work order release and due dates, and (2) operation start and stop dates. In this activity you review how these dates are calculated and how they interrelate.

1 Verify that there is no lot or serial control on items 44-100, 44-2000, and 44-7000 in Item Inventory Data Maintenance. (Lot/Serial Control field should be blank.)

2 In Work Center Maintenance, enter the information below. For other fields, use default settings.

Work Center: 12000
Description: Assembly, Controller Unit

Dept.:	10
Machine Burden Rate:	10
Setup Rate:	10
Labor Rate:	10
Labor Burden %:	100

3 Use Routing Maintenance to enter the following information:

Routing Code:	44-100
Op:	10
Work Center:	12000
Description	Assemble per spec
Run Time:	1
Move Next Op:	Yes
Auto Labor Report:	No

Routing Code:	44-100
Op:	20
Work Center:	1030
Description:	Inspect per spec
Run Time:	1
Move Next Op:	Yes
Auto Labor Report:	No

4 In Routing Cost Roll-Up, enter the following information:

Site:	12000
Cost Set:	Standard
Item:	44-100 to 44-100

5 Run Operation Cost for Site 12000, Item 44-100 to 44-100.

6 In Work Order Maintenance, enter a work order for item 44-100 with the following information:

Work Order:	class3
Item Number:	44-100

Type:	<blank>
Site:	12000
Qty Ordered:	10
Release Date:	Accept the default system date
Due Date:	Accept the default due date
Status:	E (Exploded)

7 In Work Order Routing Maintenance, enter work order class 3 and review the routing.

Notice that the scheduled operation due date for operation 20 is the same as the scheduled due date of the work order.

8 In Work Order Maintenance, enter another exploded work order (class4) for item 44-100 at site 12000, Status E, and enter a quantity of 100.

Look at the start and due dates for operations 10 and 20.

9 In Reason Codes Maintenance, enter two reason codes for type Reject and Rework.

10 In Work Order Release/Print, release work orders class3 and class4.

11 In Labor Feedback by Work Order, report labor for class3 using an existing employee code for Operation 10 for 9 good, 1 reject, and 1 rework. Run = 10.5 hours. Then report labor for 9 good at Op 20, Run = 10.5 hours.

12 Review the Operation Transaction Inquiry/Browse and the Operation Transaction Detail Inquiry to see the posting of work order transactions.

13 In Work Order Receipt Backflush, receive class3 for 9 units.

Backflush the quantity of 10 units–one was rejected and was not reworked in step 10.

14 Run and review the Work Order Cost Report and WIP Cost Report.

15 In Labor Feedback, close operation 20 and previous operations for work order class4 at 100 units complete; Run = 25.

Then run the Work Order Cost Report and WIP Cost Report.

16 Run the Work Order Receipt Backflush for class4 at 100 units.

17 In Work Order Maintenance, close class3 and class4 work orders. (Status = C.)

18 Run Work Order Accounting Close for both orders and then run the Work Order Cost Report.

Note that class4 backflushed labor at operation 10 while class3 reported it.

Course Overview

- ✓ Introduction to Shop Floor Control
- ✓ Business Considerations
- ✓ Set up Shop Floor Control
- ✓ Use Shop Floor Control

eB-SFC-PR-210

APPENDIX A

Study Questions

Study Questions

1 Explain the meaning of "operations are back-scheduled from the MRP due date."

2 Explain the Dispatch Report.

3 Give an example of non-productive labor feedback.

4 All planned orders are automatically scheduled by MRP with respect to their release and due dates.

True False

5 The Move Next Operation field is set to Yes in the Shop Floor Control File. This setting will place the operation in setup (S) status.

True False

6 MFG/PRO will track the quantity completed at each operation as the work order progresses through its routing.

True False

7 A purchase order line item with a Type field set to S refers to a subcontract operation.

True False

Answers to Study Questions

1 MFG/PRO starts scheduling at the last operation and, working back from the due date, assigns operation start and stop dates for each operation in the routing.

2 The Dispatch Report is a prioritized list of all work orders scheduled at or to arrive at a work center. The work orders are listed in descending sequence by operation start date.

3 Examples of non-productive labor feedback are machine breakdown, waiting for work, repairing tools, cleaning, or meetings.

4 True.

5 False. The Move Next Operation field setting of Yes places the operation in queue (Q) status.

6 True.

7 True.

APPENDIX B

General Ledger Effects

GL Consequences of Shop Floor Transactions

General ledger (GL) transactions are created automatically by shop floor control with a prefix of WO. Shop floor control uses Department Maintenance to identify accounts for GL posting. These accounts are labor, burden, cost of production, and labor variances. During operation completion, there is an option to complete previous operations. If this option is selected, all previously unreported operations are posted using standard labor hours.

All transactions are created using the standard setup and labor rates from the work center. Burden is posted using the standard burden rates for the work center. Labor costs are posted to the WIP account/cost center. Downtime and non-productive labor post to the Cost of Production account/ cost center. The GL accounts are taken from the department of the work center. If variances are calculated at shop floor control, then labor usage and burden usage variances are calculated.

The following table provides more detailed information on GL effects.

Function	Notes	DR / CR	Account	Defaults From
Labor Feedback by Work Order, Employee, Work Center	Actual labor	DR	Work in Process	Work Order Maintenance
		CR	Labor Absorbed	Department Maintenance
	Labor rate variance	DR	Labor Rate Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
	Labor usage variance	DR	Labor Usage Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
	Actual burden	DR	Work in Process	Work Order Maintenance
		CR	Burden Absorbed	Department Maintenance
	Burden rate variance	DR	Burden Rate Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
	Burden usage variance	DR	Burden Usage Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
Non-productive Labor Feedback		DR	Cost of Production	Department Maintenance

Function	Notes	DR / CR	Account	Defaults From
		CR	Labor	Department Maintenance
		CR	Burden	Department Maintenance
Operation Complete Transaction	Actual Labor	DR	Work in Process	Work Order Maintenance
		CR	Labor Absorbed	Department Maintenance
	Labor rate variance	DR	Labor Usage Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
	Labor usage variance	DR	Labor Usage Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
	Actual burden	DR	Work in Process	Work Order Maintenance
		CR	Burden Absorbed	Department Maintenance
	Burden rate variance	DR	Burden Rate Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance
	Burden usage variance	DR	Burden Usage Variance	Department Maintenance
		CR	Work in Process	Work Order Maintenance

APPENDIX C

Reports, Inquiries, Browses

Shop Floor Control Inquiries and Reports

Inquiry	Function / Purpose
Operation Transaction Browse	Displays a list of operation transactions by operation.
Operation Transaction Detail Inquiry	Displays a list of the detail for an operation transaction. (See "Operation Transaction Detail Inquiry" on page 75.)
Operations Accounting Report	Shows the GL transactions resulting from discrete manufacturing down time and labor transactions. Note that a similar report is available for Repetitive down time and labor transactions.
Input/Output Inquiry	Displays a list of the actual and planned standard hour input, output, and queue for a work center/machine.
Input/Output Report	Displays a summary report of the actual and planned standard hour input, output, and queue for a work center/machine. (See "Input/Output Report" on page 76.)
Operations by Work Center Report	Produces a report on operation transactions by work center/machine.
Operations by Work Order Report	Produces a report on operation transactions by work order.
Operations by Employee Report	Produces a report on operation transactions by employee.
Down Time Report	Lists transactions for each work center/machine in transaction sequence by date according to user-specified parameters. Total down time is shown for each work center for the period specified. (See "Down Time Report" on page 78.)
Down Time by Reason Report	Lists down time transactions for each reason code in sequence according to user specifications. The system charges down time to the Cost of Production (COP) account. Use Operations Accounting Report to list details on the GL transactions for the COP account.
Work Center Utilization Report	Produces a report on work center/machine capacity utilization based on labor reporting. (See "Work Center Utilization Report" on page 79.)
Efficiency by Work Center Report	Lists the following in transaction sequence by work center – transaction number and date; work order number; operation; employee number and name; labor type; quantity completed; standard, actual, and variance hours; setup and run efficiency percentages. (Setup and run totals are provided by work center/machine and for the report.) (See "Efficiency by Work Center Report" on page 80.)

Shop Floor Control Inquiries and Reports

Inquiry	Function / Purpose
Efficiency by Work Order Report	By ascending work order number, shows setup and run information by operation. It lists the following – work order item number and description; quantity ordered; quantity open; quantity in WIP; quantity completed; quantity rejected; quantity reworked; work order status; actual setup and run hours; standard setup and run hours; setup and run variance hours; setup and run efficiency percentages. (See "Efficiency by Work Order Report" on page 82.)
Efficiency by Employee Report	Shows the efficiency for all setup and run transactions for an employee during the user-selected period. The report shows work order sequence by date and includes the following – transaction number and date; work order number and ID; operation and work center; labor type (setup or run); quantity completed; standard, actual, and variance hours; setup and run efficiency percentages.

Note For tracking WIP, the following reports, found in the Work Orders module, are useful: Work Order Routing Browse and Work Order Routing Report.

Index

QAD

Your Feedback Is Important To Us

Please take a few minutes to complete and return this feedback sheet. It will help us to improve the quality of our training materials. For your convenience, you can also download this form from our web site. After you have completed the form, return it to us by fax: (856) 840-2612, or send your comments to us by email.

Web site: http://www.qad.com/services/learn
Email: learningservices@qad.com

Training Guide: Shop Floor Control
Item number: 70-2858A

How would you rate the quality of this training guide?

Organization of information:	o Excellent	o Good	o Fair
Ease of use:	o Excellent	o Good	o Fair
Content:	o Excellent	o Good	o Fair
Overall effectiveness:	o Excellent	o Good	o Fair

What suggestions, corrections, and additions to the training materials do you have?
(For specific changes, please refer to the page number and paragraph so that we can identify it.)

To order training materials from QAD, visit our web site and download the Training Materials Order Form. Send the completed order form to:

Fax: (856) 840-2612, or
email: COPS@qad.com

Your feedback is important to us. Thank you for taking the time to send it to us.

QAD