



Infor Education
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CloudSuite Industrial: Using Production Schedules and JIT/Kanban Training Workbook (9.00.30)

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About this workbook

Welcome to this Infor Education course! We hope you will find this learning experience enjoyable and instructive. This Training Workbook is designed to support the following forms of learning:

- Classroom instructor-led training
- Virtual instructor-led training
- Self-directed learning

This Training Workbook is not intended for use as a product user guide.

Self-directed learning (SDL)

If this course is eligible for self-directed learning, demos and exercises throughout this Training Workbook will be hyperlinked to Demonstration/Let Me Try simulations. In these instances, clicking the hyperlinked title launches simulations that allow you to view and practice the execution of the demo or exercise in a simulated training environment.

Activity data

You will be asked to complete some practice exercises during this course. Step-by-step instructions are provided in this guide to assist you with completing the exercises. Where necessary, data columns are included for your reference.

Your instructor will provide more information on systems used in class, including server addresses, login IDs, and passwords.

Symbols used in this workbook



Hands-on exercise
("Exercise")



For your reference



Instructor demonstration
("Demo")



Your notes



Can be used for either
"Scenario" or "Discussion"



Question



Note



Answer

Course overview

Reference materials

Reference materials are available from the following locations:

- Help menu
- Infor Xtreme®

Course duration

8 hours

Learning objectives

Upon completion of this course, you will be able to:

- Describe how to set up the parameters required for repetitive manufacturing.
- Discuss how to maintain the work center records.
- Describe how to set up the criteria required for production items and component materials for repetitive manufacturing.
- Describe how to copy and manipulate routings and bills of material.
- Explain how to generate production schedules.
- Describe how to update production schedules.
- Explain how to manage the supply of floor stock locations.
- Describe how to record production schedule transactions.
- Describe how to record just-in-time production and work center transactions.

Audience

- Customer User
- Pre-Sales Consultant
- Business Consultant
- Technical Consultant
- Support

System requirements

- CloudSuite Industrial 9.00.20 PLUS Training Environment

Prerequisite knowledge

To optimize your learning experience, Infor recommends that you have the following knowledge prior to attending this course:

- Knowledge of foundational concepts
- Knowledge of how data is structured and organized
- Ability to navigate the user interface

Course description and agenda

This course provides an overview of repetitive production control system and lists the factors to consider for its implementation. It also covers the setup for repetitive manufacturing, the use of operation control points and backflushing, creation of standard and production schedule BOMs, development and implementation of a production schedule, and the repetitive manufacturing processing.

Prerequisites:

- CloudSuite Business / CloudSuite Industrial: v9 Managing Inventory
- CloudSuite Business / CloudSuite Industrial: v9 Using Bill of Materials & Engineering Change Notices (BOM/ECN)

Lesson	Lesson title	Learning objectives	Day
Course overview		Review course expectations.	1
1	Introducing the repetitive production control system	Summarize the repetitive production control system. Compare the production control processes.	1
2	Setting up repetitive manufacturing	Identify work center settings needed for repetitive manufacturing. Describe how to set up a scrap account. Describe how to set up a floor stock location. Explain how production items and material items must be set up to support repetitive manufacturing.	1
3	Backflushing and control points	Describe how control points and backflushing are used in production schedule processing. Identify the steps to set up control points and backflushing for an item routing.	1
4	Creating standard bills of materials (BOMs) for repetitive items	Describe the process to create a current BOM for a production item in repetitive manufacturing. Determine the "Pieces per Hour" rate for a routing operation. Identify the utilities and the sequence they are used to create a standard BOM.	1
5	Creating production schedules	Order the steps to define a production schedule for repetitive manufacturing. Identify the BOMs that are needed for production scheduling and describe the processes in which they are created.	1

Lesson	Lesson title	Learning objectives	Day
6	Production schedule processing	<p>Explain the process for replenishing floor stock locations.</p> <p>Identify the transactions that are used for production schedule processing.</p> <p>Describe the steps for recording completion of production schedule finished goods and scrap inventory.</p> <p>Identify the reports that are generated to monitor production schedule finished goods.</p>	1
7	Other transactions	<p>Determine when work center transactions should be used.</p> <p>Explain how just-in-time (JIT) transactions are recorded.</p> <p>Explain how work center transactions are recorded.</p>	1
Course summary		Debrief course.	1

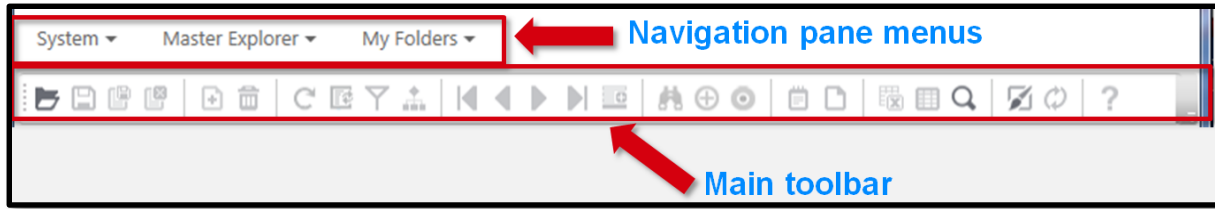
Appendices

There are appendices at the end of this Training Workbook that you may find useful. They contain information that is not part of the instructional content of this course but provide additional related reference information.

Appendix	Appendix title	Content description
Appendix A	Review scenario	A comprehensive scenario for practicing the concepts and procedures learned in the course
Appendix B	Reports and utilities	<ul style="list-style-type: none">• Various repetitive manufacturing reports with a description of each report's output• Reports introduced in this course• Various repetitive manufacturing-related utilities with a description of each utility's purpose
Appendix C	Additional implementation information	Information describing additional factors for consideration when implementing repetitive manufacturing
Appendix D	Summary of planning tools	A summary of the various manufacturing planning tools
Appendix E	Form navigation	Forms that are used for repetitive manufacturing and where they are found

User interface

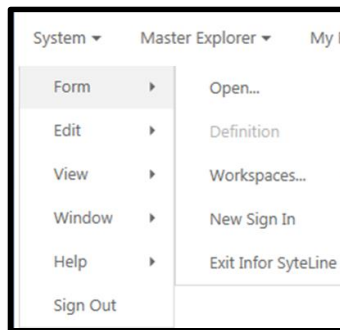
Standard user interface elements include the top navigation pane menus and the main toolbar.



Navigation pane menus and main toolbar

Navigation pane menus

You can browse all available folders through the navigation pane menus and submenus. Hovering your mouse over each of the navigation pane menus allows you to explore the submenus contained beneath.



Navigation pane menus and submenus

You can pin submenus to the navigation pane. For example, if you know that you will be using the Customer Service submenu frequently, you can display the menus at the top level, by pinning them to the navigation pane.

Main toolbar

The main toolbar contains icons that allow you to quickly complete commonly used tasks, such as saving data or closing a form. You can position your mouse pointer over an icon on the toolbar to reveal its description and functionality.

Keyboard shortcuts

Some navigation pane submenus display available keyboard shortcuts that can be used to save multiple steps when completing certain tasks.



Keyboard shortcuts

The following table displays the available shortcut keys and their actions.

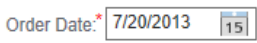

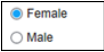

Shortcut keys	Action
Navigating Forms	
Ctrl + F4	Close current form.
Ctrl + O	Open Select Form.
Ctrl + W	Open workspaces.
Ctrl + Tab	Switch view to next open form.
Navigating records	
Ctrl + Home	Move to first editable field of form.
Tab	Move to the next field.
Shift + Tab	Move to the previous field.
F8	Move to the next record.
F7	Move to the previous record.
Ctrl + F8	Switch the next collection on the form to become the current collection in a form that contains multiple collections.
Ctrl + 1	Hide/Show 1st Splitter Pane. Toggles the first splitter pane between being hidden from view and being shown. If the form contains a vertical splitter bar, the first splitter pane is the left pane. For a form that is split horizontally, the top pane is the first splitter pane. Alternatively, select System > View > Hide/Show 1st Splitter Pane
Ctrl + 2	Hide/Show 2nd Splitter Pane. Toggles the second splitter pane between being hidden from view and being shown. On a form with a vertical splitter bar, the second splitter pane is the right pane. For a form that is split horizontally, the bottom pane is the second splitter pane. Alternatively, select System > View > Hide/Show 2nd Splitter Pane.
Editing records	
F2	Activate the drop-down list with an implied asterisk (i.e., wildcard) after the entered text in the field to then populate the list with data entries that begin with the entered text.
Ctrl + N	Add new record. Alternatively, select System > Actions > New. Note: The Actions menu is only available when a form is open.
Ctrl + A	Add value for current field. Alternatively, select System > Edit > Add.
Ctrl + C	Copy

Shortcut keys	Action
Editing records, continued	
Ctrl + X	Cut
Ctrl + V	Paste
Ctrl + Z	Undo. Alternatively, select System > Edit > Undo.
Ctrl + D	Delete record. Alternatively, select System > Actions > Delete. Note: The Actions menu is only available when a form is open.
Ctrl + F	Find value for current field. Alternatively, select System > Edit > Find Value for Current Field. Note: This is only accessible for certain field types, such as some drop-down lists.
Ctrl + L	Display details for current field drill down. Alternatively, select System > Edit > Details for Current Field. Note: This only works for certain field types, such as some drop-down lists.
Ctrl + S	Save changes. Alternatively, select System > Actions > Save. Note: The Actions menu is only available when a form is open.
Filtering records	
F3	In Filter In Place mode, cancel the filter in place and return to the collection previously displayed. Alternatively, select System > Actions > Filter > Cancel in Place.
F4	<ul style="list-style-type: none"> In Refresh/Run mode, begin filter in place (i.e., clear the collection and go back to Filter In Place mode). Alternatively, select System > Actions > Filter > Begin in Place. In Filter In Place mode, execute in place (i.e., run the filter). Alternatively, select System > Actions > Filter > Execute in Place.
F5	<ul style="list-style-type: none"> In Refresh/Run mode, refresh the current collection. Alternatively, select System > Actions > Refresh. In Filter In Place mode, clear the filter in place. Alternatively, select System > Actions > Filter > Clear in Place.
Ctrl + F5	In Refresh/Run mode, refresh the current record. Alternatively, select System > Actions > Refresh current.
Ctrl + F2	In Refresh/Run mode, repeat Find Value in Collection. Alternatively, select System > Edit > Repeat Find.
Ctrl + Q	In Refresh/Run or New mode, open associated query form to specify filter criteria. Alternatively, select System > Actions > Filter > By Query.

Other	
F1	Open field level help topic.
Ctrl + E	Toggle design mode on and off. Alternatively, select System > Edit > Design
Ctrl + P	Print

Field types

The following tables display the field types available with a brief description:

Field type	Description
Required, system-generated, and read-only fields	
	<ul style="list-style-type: none"> Any field that is required will have a red star A system-generated field will have a green star A field with no border around the data is read-only
Standard GUI fields	
	Check box indicating Yes or No
	Radio button to select one option from multiple choices
	Drop-down list to select one option from multiple choices

Forms and reports

Basic elements include forms and reports. Forms provide an organized view to the data stored in the database. Just about everything you do uses a form element. You use different types of forms depending on whether you need to add new information, modify existing information, or view the details of a specific record.

- Forms are made up of records that contain multiple fields of data. Records consist of a group of related pieces of information. Fields are the basic elements that display the related data pieces and are grouped together to make up a record.
- When a form displays multiple records, it is referred to as a collection. A collection displays multiple records that have some commonality.

Reports are used to organize and present filtered collections of related data.



Lesson 1: Introducing the repetitive production control system

Estimated time

40 minutes

Learning objectives

After completing this lesson, you will be able to:

- Summarize the repetitive production control system.
- Compare the production control processes.

Topics

- Overview
- Repetitive process flow
- Production control processes
- Will repetitive manufacturing work for you?
- Demo: Production schedule processing

Overview

Manufacturing production control systems can be grouped into three categories:

- Flow manufacturing
- Intermittent manufacturing
- Project manufacturing

Flow manufacturing includes repetitive manufacturing (units are discrete, e.g. appliances) and continuous manufacturing (goods made in continuous flow, e.g. gasoline). The table below shows which module supports each system.

Manufacturing category	Module
Flow (repetitive)	Production schedules Just-in-time (JIT)/KANBAN
Intermittent	Job orders
Project	Projects

Manufacturers in a hybrid or repetitive environment organize sections of the shop floor differently from a traditional job shop. In the hybrid or repetitive environment, work centers will be grouped together into cells with objectives of achieving manufacturing efficiencies and reducing non-value added tasks, such as move time between operations and unnecessary material handling between work centers. This allows a more flow-like manufacturing pattern to emerge.



In this training workbook, the term cell is used in the same manner as assembly line or production line.

Repetitive process flow

To use the system to support your repetitive processes, you'll follow the procedure below. In this class, you will perform each step.

1. Set up resources to model your production lines or cells.
2. Set up work center costing accounts.
3. Flag items to be manufactured repetitively.
4. Set up scrap account on product codes.
5. Set up backflushing and control points in the current routings/BOMs.
6. Set backflush locations for materials.
7. Create standard BOM for each repetitive item.
8. Create production schedule (PS), PS items, and PS releases.
9. Release production schedule lines.
10. Record production schedule and work center transactions.
11. Run end of period costing.



Production control processes

The chart below compares key functions of the systems repetitive and intermittent systems.

Function	Job orders	Production schedules	JIT/Kanban
Costing method	Job costing actual or standard	Process costing standard	Process costing standard
Cost accumulation ¹	By Job/operation	To work center	To work center
Scheduling	APS (backward) ² Scheduling (forward)	APS (backward) Scheduling (forward)	APS (backward) Scheduling (forward) ³
Capacity management	Resources	Resources	Resources ⁴
Engineering change notice (ECN) control	Yes	No	No
Routing/Bill of Material (BOM)	Current Job	Current Production schedule Standard	Current
Production	By Job	By Item By Production schedule	By Item
<p>¹ Accumulated costs include direct labor, materials and machine, labor, and materials overhead allocations.</p> <p>² APS = Advanced Planning System module</p> <p>³ While you control flow using Kanban, you can still plan and schedule planned orders to provide dispatch and see capacity.</p> <p>⁴ You can see the planned and scheduled resources for planned orders.</p>			

Will repetitive manufacturing work for you?

Ask yourself the following questions to help determine if the systems repetitive manufacturing processes will work for you.

- Do you have products or families of products that are made repeatedly?
- Do the costs for these products not fluctuate so that standard costs can be implemented?
- Are production rates and BOM data for these products accurate?
- Is work center-level cost visibility for these products sufficient?



With repetitive manufacturing you do not have the ability to view costs at the item level; costs are viewed at the work center level.

- Do you have the flexibility so that job orders can still be used for other items (product lines)?
- If you can answer “Yes” to all of the above questions, it is likely that you can utilize the systems repetitive manufacturing processes.



Demo: Production schedule processing

Your instructor will demonstrate some typical production schedule processes so that you can get an idea of how production schedules are used for repetitive manufacturing.





Exercise 1.1: Production schedule processing

In this exercise, you will work with some typical production schedule processes so that you can get an idea of how production schedules are used for repetitive manufacturing.

Exercise 1.1 steps

Part 1: Create a production schedule for the MB-10000

1. Select **Master Explorer > Modules > Production > Production Schedules > Production Schedules** to open the Production Schedules form. The **Production Schedules (Filter In Place)** form opens.
2. Click **Filter In Place** on the toolbar to turn off the filter-in-place mode.

The Production schedule **PS00000001** record displays.

- There are two parts to a production schedule – the header and the items being produced under the schedule. More than one item can be manufactured on same schedule.

- With job orders there is something called co-products. Production schedules are much simpler than co-products. The reason that the two items are in the same production schedule is that they are run on the same assembly line. You might group them by families of items, by schedulers, etc.

3. Click **Items/Releases**.

The **Production Schedule Items** form opens with item **MB-10000** displayed.

- Here you can view the schedule of what is going to be produced. All of the scheduled releases and due dates for the MB-10000 are listed in the grid. A production schedule can stay open forever. It is the releases that are closed over time.

4. Click the **X** on the tab of the **Production Schedule Items** form to close the form. The **Production Schedules** form should be the active tab.

5. Click **Create new object in the current collection**.

6. Click **Save**. The system assigns the next sequential **Schedule ID**.

7. Click **Items/Releases**. The **Production Schedule Items (Linked)** form opens.

8. Select **MB-10000-Bicycle,Model-180,Mountain,Black/White** from the **Item** drop-down list.

9. Click **Save**.

There is now a BOM for the production schedule item as shown by the selection of the “PS Item BOM Exists” check box.

10. Select a date <one week from today> in the **Due Date** field of the first line in the grid.

11. Type **40** in the **Released** field.

12. Select a date <two weeks from today> in the **Due Date** field of the second line in the grid.

13. Type **60** in the **Released** field.

14. Select **Released** from the **Status** drop-down list on line 1 of the grid. A dialog box opens displaying the message: [Change Production Schedule Release Status] will be performed for Production Schedule Releases that has [Schedule ID: PS00000011] and [Item: MB-10000] and [End Date: 10/29/2014].

Status is Planned and will be Released.”

15. Click **OK**. A dialog box opens with the message, “[Copy Routing BOM] will be performed.”

16. Click **OK**.



There are other ways to copy the BOM to the production schedule releases, or a BOM can be manually created.

17. Select **Released** from the **Status** drop-down list on line 2 of the grid. A dialog box opens with the message, “[Change Production Schedule Release Status] will be performed for Production Schedule Releases that has [Schedule ID: PS00000011] and [Item: MB-10000] and [End Date: 10/29/2014].”

Status is Planned and will be Released.”

18. Click **OK**. A dialog box opens with the message, “[Copy Routing BOM] will be performed.”

19. Click **OK**.

20. Click **Save modified data and close form (OK)**.



This production schedule has nothing to do with the Master Production Schedule in planning and other production schedules in planning. They are planning tools but they are not shop floor control tools.

A production schedule has been created. If you use the Advanced Planning System (APS) or the Material Requirements Planning (MRP) modules, they will create planned orders and suggestions for you and you will be able to firm those up, just like you firm up planned orders into jobs. It will also firm them up into releases here on any given production schedule. Once you have it all set up, the next step is to record the pieces completed.

21. Close the **Production Schedules** form.

Part 2: Complete a quantity of 20 for MB-10000

1. Select **Master Explorer > Modules > Production > Production Schedules > Activities > Production Schedule Complete Transactions**. The **Production Schedule Complete Transactions** form opens.
2. Type *MB-10000* in the **Item** field.
3. Type *20* in the **Completed** field.
4. Select the [production schedule that you just created] from the **Schedule ID** drop-down list.
5. Select **PS-FRM** from the **Work Center** drop-down list.
6. Click the tab for the **Production Schedule Items (Linked)** form.
7. Click Release Operations. The **Production Schedule Release Operations (Linked)** form opens.



Repetitive manufacturing is to produce something that you know how to build, so backflushing can be used. Notice the Work Center and the Backflush fields.

8. Select each of the **operations** from the list in the left panel.



All of the operations are set to backflush and some of them are set as control points so you don't have to record them as complete for backflushing to take place.

9. Click the **Materials** button. The **Production Schedule Release Materials (Linked)** form opens.
 - Since you know how much material is used for an operation, you can backflush materials as well.
 - If there are overtime hours, then you have to enter that time in addition to what is being backflushed. Also, if you use more materials than what is called for in the BOM, then you will have to enter those transactions.
10. Go back to the **Production Schedule Complete Transactions** form.
11. Select **1 – Daniels, David** from the **Employee** drop-down list.
12. Click **Process**. A dialog box opens with the message,
13. Click **OK**.
14. Display the **Production Schedule Items** form and refresh the form.
15. View the **Completed** field for the first release.

The Completed field will only keep a count on the number of items that completely went through the entire bill of materials. Completion was recorded for 20 items only through operation 20 (two

operations). Completion of all four operations of the BOM would have to be recorded for the Completed field to be incremented.

This demonstration was a good look at the repetitive manufacturing operation. You can see how you are able to save a lot of time compared to job orders processing. With job orders, the work-in-progress (WIP) costs roll up to the job order, etc. In repetitive manufacturing, all of the costs are rolled up to the work center.



Lesson 2: Setting up repetitive manufacturing

Estimated time

40 minutes

Learning objectives

After completing this lesson, you will be able to:

- Identify work center settings needed for repetitive manufacturing.
- Describe how to set up a scrap account.
- Describe how to set up a floor stock location.
- Explain how production items and material items must be set up to support repetitive manufacturing.

Topics

- Introduction
- Setting up work centers
 - Scheduling
 - Accounts
 - Variance
 - Overhead accounts
 - Resource groups
- Setting up a scrap account
- Setting up a floor stock location
- Setting up items for production
 - Item fields to modify
 - Activate backflushing for materials used in production

Introduction

When using repetitive manufacturing, there are some setup tasks that need to be completed.

- You will be using production schedules to support your repetitive manufacturing. Before you build a BOM and release production schedules, you need to:
- Set up work centers to support the process costing.
- Set up items to support production schedules.

The table below summarizes the setup tasks that need to be completed.

On this form...	Set up...
Work Centers	WIP, variance, and overhead accounts Control points Backflushing defaults
Product Codes	Scrap account
Location	Floor stock locations
Items	Cost type Production type Backflushing default

Setting up work centers

When using repetitive manufacturing, there is some setup that needs to be done. Let's start with the Work Centers form. Since costing is done at the work center level, we need to populate the WIP accounts on the Accounts tab, the variance accounts on the Variance tab, and the overhead accounts on the overhead accounts tab. Also on the Scheduling tab you need to review the settings for backflushing.

Repetitive manufacturing assumes that you are going to backflush labor and machine as much as possible so it is important to set backflushing and control points for these work centers.

Control points in a routing minimize the number of entries required to record production. Reporting production complete can only occur at control points when using production schedules. The last operation for a production schedule routing should be designated as a control point. More detail on the use of control points is presented in the next lesson.

To add a new work center record to the system, you would open the Master Explorer > Modules > Production > Work Centers > Work Centers form. Once opened, you can add a new record and enter the appropriate data in each tab's fields.

For example, on the Scheduling tab, the fields you will find include:

- **Work Center** – enter the work center ID.
- **(Description)** – enter the work center description.
- **Department** – select a Department for the work center.
- **Backflush** - select Labor, Machine, Both, or Neither to indicate whether labor and/or machine time is to be backflushed.
- **Control Point** – select this check box to designate the work center as a control point for recording routing transactions. This setting becomes the default setting on routing operations associated with this work center.

On the Resource Groups tab, available fields include:

- **Group** – select a resource group to associate with this work center.
- **Quantity** – enter the quantity of the selected resource group required for this work center.
- Add additional resource groups as needed.

Account numbers for the following work-in-progress (WIP) accounts are found on the Accounts tab:

- Material WIP Acct
- Labor WIP Acct
- Fixed Ovhd WIP Acct
- Variable Ovhd WIP Acct
- Outside WIP Acct

Account numbers for each of the following variance accounts are found on the Variance tab:

- Material Usage Variance
- Labor Rate Variance
- Labor Usage Variance

Account numbers for each of the following overhead accounts are found on the Ovhd Accts tab:

- Fixed Matl Ovhd Usage
- Var Matl Ovhd Usage
- Fixed Labor Ovhd Usage
- Var Labor Ovhd Usage
- Fixed Mach Ovhd Usage
- Var Mach Ovhd Usage

After completing all necessary information for the work center record, you should save the record.

Setting up a scrap account

When you post pieces scrapped, the system will post the cost of that piece up to and including the operation where you posted scrap. Then it will move the expense into a PS Scrap Expense account. You set up the scrap account on the Product Codes form.

To set up a scrap account you begin by opening the Product Codes form from the Master Explorer > Modules > Material > Inventory > Files folder. Then, select the product code to which you are adding a scrap account. Next, go to the Misc tab, select an account number for the scrap account from the PS Scrap Expense drop-down list, and then save the record.



The product code for which you are specifying a scrap account should be the product code assigned to the component material items used to manufacture the finished product.

Setting up a floor stock location

In a repetitive manufacturing environment, materials are often kept at the point of use, and, unless you have lot or serial number tracked items, you will backflush your materials.

These point-of-use locations are called floor stock locations and are attached to the work center.

A floor stock location is associated with a work center on the Locations form. The **Floor Stock Replenishment Report** uses only this relationship when it calculates what is needed to fill floor stock locations for production.

To set up a floor stock location you begin by opening the Locations form. You would then add a new record, enter a location code for the new location, provide a description of the location, and select the work center to which this floor stock location is associated from the WC drop-down list. Finally, you should save the record.



Demo: Set up work centers and floor stock location

Your instructor will demonstrate how to set up work centers and a floor stock location for repetitive manufacturing.



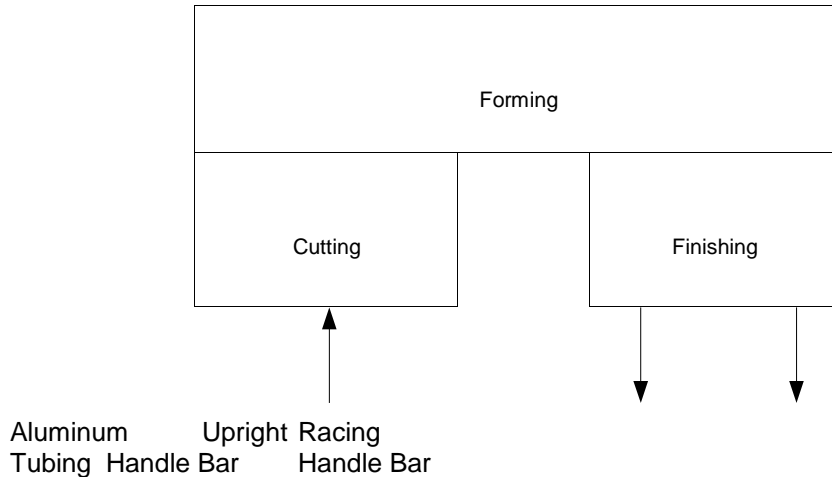


Exercise 2.1: Set up work centers and floor stock location

In this exercise, you will set up work centers and a floor stock location for repetitive manufacturing.

Progressive Cycles has decided to manufacture the handlebars for their bicycles that they had previously purchased. They will be built in a special cell dedicated to making both styles of handlebars, the upright and racing. The handlebar items are TA-30000 (upright) and TA-31000 (racing).

The graphic below shows the cell that will manufacture them. There are three operations in this cell.



Exercise 2.1 steps

Part 1: Create work center H-Cut and verify account number and Unit Code 2 combinations

Find the PS-FIN work center record and copy it three times. Then, update the three copies to create the three new work centers shown below.



Account Numbers are necessary for repetitive production transactions. For more information on costing, see the *Costing Training Workbook*.

1. Select **Master Explorer > Modules > Production > Work Centers > Work Centers**. The **Work Centers (Filter In Place)** form opens.
2. Click **Filter In Place**.
3. Select **Line 24 (PS-FIN)**. Ensure the line is highlighted in blue.
4. Right-click **Line 24 (PS-FIN)**. A drop-down list displays.
5. Select **Copy**.
6. Type *H-CUT* in the **Work Center** field to replace the existing text.
7. Type *Cutting* in the field to the right of the Work Center field (description) to replace the existing text.
8. Select **600** in the **Department** field, if it is not already selected.
9. Select **Both** in the **Backflush** field, if it is not already selected.
10. Select the **Control Point** check box.
11. Click the **Costing** tab.
12. Type *15* in the **Setup Rate** field, if the field does not already contain that value.
13. Type *15* in the **Run Rate (Lbr)** field, if the field does not already contain that value.
14. Click the **Accounts** tab.
15. Verify Account number and Unit Code 2 combinations for the accounts in the table below.

Account name	Account number	Unit code 2
Material WIP Acct	12260	0009
Labor WIP Acct	12262	0009
Fix Ovhd WIP Acct	12264	0009
Var Ovhd WIP Acct	12266	0009
Outside WIP Acct	12268	0009

16. Click the **Variance** tab.

17. Verify Account number and Unit Code 2 combinations for the accounts in the table below.

Account name	Account number	Unit code 2
Matl Usage Variance	51500	0009
Labor Rate Variance	51600	0009
Labor Usage Variance	51700	0009

18. Click the **Ovhd Accts** tab.

19. Verify Account number and Unit Code 2 combinations for the accounts in the table below.

Account name	Account number	Unit code 2
Fix Matl Ovhd Usage	51830	0009
Var Matl Ovhd Usage	51880	0009
Fix Labor Ovhd Usage	51810	0009
Var Labor Ovhd Usage	51860	0009
Fix Mch Ovhd Usage	51820	0009
Var Mch Ovhd Usage	51870	0009

20. Click the **Resource Groups** tab.

21. Select **Cut-10-MRG** from the **Group** drop-down list on the first line of the grid.

22. Click **Save**.

Part 2: Copy PS-FIN work center and create H-FORM and H-FIN work centers

1. Select **Line 24 (PS-FIN)**, ensure the line is hi-lighted in blue.
2. Select **System > Edit > Copy** Ensure the line is highlighted in blue.
3. Right-click **Line 24 (PS-FIN)**. A drop-down list displays.
4. Select **Copy**.
5. Type *H-FORM* in the **Work Center** field to replace the existing text.
6. Type *Forming* in the field to the right of the **Work Center** field (description) to replace the existing text.
7. Select **600** in the **Department** field, if it is not already selected.

8. Select **Both** in the **Backflush** field, if it is not already selected.
9. Repeat steps 10 through 18. Then proceed with step 32.
10. Click the **Resource Groups** tab.
11. Select **PS-FRM-LRG** from the **Group** drop-down list on the first line of the grid.
12. Click **Save**.
13. Right-click. A drop-down list displays.
14. Select **Copy**.
15. Type *H-FIN* in the **Work Center** field to replace the existing text.
16. Type *Finishing* in the field to the right of the Work Center field (description) to replace the existing text.
17. Select **600** in the **Department** field, if it is not already selected.
18. Select **Both** in the **Backflush** field, if it is not already selected.
19. Select the **Control Point** check box.
20. Click the **Resource Groups** tab.
21. Select **PS-FIN-LRG** from the **Group** drop-down list on the first line of the grid.
22. Click **Save modified data and close form (OK)**.

Part 3: Create a new location

1. Select **Master Explorer > Modules > Material > Inventory > Locations**. The **Locations** form opens.
2. Click **Create new object in the current collection**.
3. Type *H-CUT* in the **Location** field.
4. Type *Floor Stock* in the **Description** field.
5. Select work center **H-CUT** from the **WC** drop-down list.
6. Click **Save modified data and close form (OK)**.

Setting up items for production

On the Items form, you need to set the cost type to “Standard” for items to be produced using repetitive manufacturing. On the Planning tab, if planning is being used, you need to set the production type to “Prod Sched” or “Just-In-Time” for these items to control the type of plan that planning will create. If using production schedules, you can also set a default “Rate per Day” for production schedule releases.

Item fields to modify

Items manufactured with production schedules use the following settings:

- Cost Type = "Standard"
- Production Type = "Prod Sched"
- Rate/Day = demonstrated number of items the cell can produce in a day

Items form – General tab

Cost Type

Items that are being manufactured using production schedules and JIT must have a cost type of “Standard.” Select Standard from the Cost Type drop-down list for the production item.

Items form – Planning tab

Production Type

When the item is set to standard costing, this field becomes active. Select “Prod Sched” from the Production Type drop-down list for the production item.

Rate/Day

The quantity normally manufactured per day for the production item is entered in the Rate/Day field. This quantity will be used as the default value for the Generate Production Schedule activity.

Activate backflushing for materials used in production

Next in our setup are the components that are used as materials on the bill of materials for production schedules and just-in-time transactions. These materials should be specified as backflushed unless they are lot-tracked or serial-tracked.

Materials specified on the BOM’s of production schedule items usually have their Backflush check box set selected. If materials are lot or serial number tracked, you cannot backflush them. Lot tracked and serial tracked items would have to be issued using the Work Center Material Transactions form.

On these items you can select the Backflush check box on the Controls tab and add a backflush location.

Items form – Controls tab

Backflush

The Backflush check box is selected to specify that this item can be backflushed. This field may be selected only if the “On Hand Negative Flag” is selected on the Inventory Parameters form and the Lot and Serial Track check boxes are not selected on the Items form.

Backflush Location

The location from which material should be relieved when backflushing occurs is selected from the Backflush Location drop-down list. This field may also be left blank. This field can only be updated if the Backflush check box is selected.

The next lesson provides much more detail on backflushing and control points.





Demo: Set up items for production

Your instructor will demonstrate how to set up production and material items for repetitive manufacturing.





Exercise 2.2: Set up items for production

In this exercise, you will set up production and material items for repetitive manufacturing.

Exercise instructions

The handlebar cell manufactures two kinds of handlebars: upright and racing. They are made out of a single material: aluminum tubing. Progressive Cycles has already been purchasing these items, therefore an Items record exists for each of them. However, since we will now be manufacturing the handlebars it will be necessary to make some changes to each of these items.

Exercise 2.2 steps

Part 1: Change item TA-30000 and TA-31000 to source Manufactured, product code FG-200, cost type Standard, set production schedule and clear the backflush

1. Select **Master Explorer > Modules > Material > Inventory > Items**. The **Items (Filter In Place)** form opens.
2. Click **Filter In Place**.
3. Select **TA-30000-Handle-Bars,Upright** from the list in the left pane.
4. Select **Manufactured** from the **Source** drop-down list.
5. Select **FG-200** from the **Product Code** drop-down list. A dialog box opens with the message, "Product Code was PP and now is FG-200. Automatically update Accounts and Unit Codes on the Item Stockroom Locations form when this record is saved?"
6. Click **Yes**.
7. Select **Standard** from the **Cost Type** drop-down list. A dialog box opens with the message, "Cost Type was Actual and now is Standard. [Update Unit Cost] will be performed on Save."
8. Click **OK**.
9. Select **Standard** from the **Cost Method** drop-down list.
10. Click the **Planning** tab.
11. Select **Prod Sched** from the **Production Type** drop-down list.
12. Type *50* in the **Rate/Day** field.
13. Click the **Controls** tab.
14. Clear the **Backflush** check box.
15. Click **Save**.
16. Select item **TA-31000-Handle-Bars,Upright** from the list in the left pane.
17. Repeat steps 4 through 11. Then proceed with step 18.
18. Type *30* in the **Rate/Day** field.
19. Click the **Controls** tab.
20. Clear the **Backflush** check box.
21. Click **Save**.

Part 2: For ZAL-200 set backflush

1. Select item **ZAL-200-Aluminum,Tube,1/8",1"dia (ACT-FIFO)** from the list in the left pane.
2. Click the **Controls** tab.
3. Select the **Backflush** check box, if it is not already selected.
4. Delete the value in the **Backflush Location** field.
5. Click **Save modified data and close form (OK)**.



Check your understanding



What must the cost type be for an item that is produced under a production schedule?



- a) Actual
- b) Average
- c) Estimated
- d) Standard



Where is a scrap account to be used in repetitive manufacturing specified?



- a) Chart of Accounts form
- b) Product Codes form for the product code assigned to a component material
- c) Product Codes form for the product code assigned to a production item
- d) Work Centers form for the work center where a component material is used



At which level is costing in repetitive manufacturing maintained?



- a) Job
- b) Item
- c) Work Center
- d) Product code



Lesson 3: Backflushing and control points

Estimated time

50 minutes

Learning objectives

After completing this lesson, you will be able to:

- Describe how control points and backflushing are used in production schedule processing.
- Identify the steps to set up control points and backflushing for an item routing.

Topics

- Introduction
- Control points
 - Setting up control points
 - Control point processing
 - What happens when a control point is posted?
- Backflushing
 - About backflushing labor and machine hours
 - Backflushing labor hours
 - Backflushing machine hours
 - About backflushing materials
 - Hierarchy of backflush locations
 - Inventory parameters
 - Items form – Control tab
- Backflushing materials

Control points

Use of control points can greatly reduce the number of manual entries needed to report production. Control points on operations serve two purposes:

To define the operations on a routing from which production is reported

To manage backflushing through multiple operations



You can set each operation on a routing to be a control point and report production for each one, or you can set selected operations as control points and backflush the appropriate production quantities through the previous non-control point operations.

When a work center is created, you must specify whether it is a control point or not. This setting will be the default value for the routing operation when a work center is associated with the operation. It is possible to overwrite the default for each operation of a routing. Any and all operations within a routing can be specified as a control point.

The production schedule transactions can only be recorded at control points so the last operation in a routing should always be a control point for a repetitive item. Then a production schedule transaction can be posted that moves items into inventory.

This last operation can be the only control point in a routing bill of material if you like which means that all of the other operations would automatically backflush once a production schedule transaction is posted against the last operation.

You can set control points strategically throughout the routing and when posting a production schedule transaction at a control point, backflushing will take place and will flow back through the routing until it comes to a previous control point.

Setting up control points

On the Work Centers form, select the Control Point check box to designate this work center as a control point. If you are using the Backflushing feature, you can use control points to capture cost during production instead of waiting until production is complete. When using a work center for repetitive manufacturing, you can record production only at those work centers you have defined as control points.

On the Operations form, select the Control Point check box to designate the operation as a control point. The setting of this check box defaults from the work center it is associated with. Clear the check box if the operation should not be a control point.

Control point processing

Backflushing is triggered automatically when you enter a quantity other than zero for quantity complete or scrapped for a posted transaction. If the operation is a control point, the system will look for preceding operations to verify whether they are control points or not. If not, then the system assumes that the preceding non-control point operations associated with that control point will also have the same quantity complete value backflushed.

When you report a scrapped quantity for a control point, the same scrapped quantity is added to the quantity complete for all prior operations that are tied to that control point.

For a production scheduled item, if scrap is reported on a non-control point operation, the quantity complete is updated for all previously associated non-control point operations and those operations will be backflushed.

For example, if you have this routing:

Operation	Control point?
10	No
20	Yes
30	No
40	No
50	Yes

When you post pieces complete at operation 20, the system will backflush operation 20. Then it will post the same quantity complete at operation 10, which in turn will trigger backflushing at that operation.

When you post pieces complete at operation 50, the system will backflush operation 50. Then it will post the same quantity complete at operations 40 and 30, which in turn will trigger backflushing at those operations.

What happens when a control point is posted?

Based on how you have set up your **Inventory Parameters** form, **Items** form - **Controls** tab, **Operations** form, and **Materials** form for backflushing, when a control point is processed, the system will perform the following:

- Manage the number of operations backflushed by a single transaction
- Process each operation controlled by the control point in turn, starting with the lowest operation number
- Backflush materials on the BOM for all operations controlled by the control point where the material has been set up to be backflushed
- Backflush labor and/or machine hours for all control points for operations where the Backflush field is set to Labor, Machine, or Both
- Absorb/backflush overhead for all operations controlled by the control point based on the setting for overhead basis in the work center
- Move quantities to the next operation or to inventory (if it is the last operation), for all operations tied to the control point
- Post or receive into inventory all quantities (received, complete, scrapped and moved), when appropriate
- Apply scrap factors to the material issues

Backflushing

Backflushing is the deduction from inventory records of the component parts used in an assembly or subassembly by exploding the bill of materials by the production count of assemblies produced.

Backflushing enables you to record the manufacture of items without having to create job orders. This is particularly relevant in situations where the production runs are short and the benefits derived from creating a job order to track the activity on the shop floor do not justify the cost of processing all the data normally required for a job order.

Backflushing is a streamlined process where the raw material is never issued to the shop floor or work in progress even though the material is physically moved from the warehouse to production. Instead, the system will continue to show the material still in raw material inventory. Then when the finished assembly is transferred to finished goods, the system automatically pulls all materials on the manufacturing bill of materials out of raw materials inventory and issues them to finished goods inventory.

Backflush vs. traditional inventory flow

If you are set up to backflush, you simply record pieces completed or scrapped at a routing operation, and the system will automatically create all the remaining material and operation transactions that would be necessary to complete or scrap that quantity.

About backflushing labor and machine hours

To backflush labor hours and machine hours, you must select the appropriate value on the Backflush check box on the Operations form. The default value displays from the work center used in the operation, but you can overwrite it for each operation for the current routing, job routing, and production schedule routing. You can specify backflushing of labor hours, machine hours, both, or neither, by operation.

The system backflushes labor and machine hours based on 100% of the routing. The system does not consider manual entries of labor or machine hours for the current transaction.

Backflushing labor hours

When you post completed transactions, the system backflushes labor hours if the Backflush field for the operation is set to "Labor" or "Both."

Backflushing occurs automatically when you post quantities for completed transactions or report scrap. The number of labor hours backflushed is based on the quantity complete or scrapped quantities multiplied by the labor hours per piece (defined on the routing). The system does **not** consider labor hours that have been previously backflushed or manually issued.

For repetitive manufacturing, the system uses the production schedule BOM for backflushing labor. The system creates material transactions and inventory journal transactions with costs from the work center record. The system creates a production schedule transaction each time labor is backflushed.

Note: For production schedules, if you specified Setup Hours on the PS item routing, the system creates a setup transaction for every PS release when any labor hours are backflushed.

Backflushing machine hours

When the Backflush field is set to "Machine" or "Both," the system backflushes the machine hours.

Backflushing occurs automatically when you post quantities for completed transactions or report scrap. The number of machine hours backflushed is based on the quantity complete or scrapped quantities

multiplied by the machine hours per piece defined on the routing. For the current transaction, the system does not consider machine hours that have been previously backflushed or manually issued.

For repetitive manufacturing, the system uses the production schedule BOM for backflushing machine hours.

Material transactions and inventory journal transactions are created with costs from the work center record. The system creates a machine job transaction each time machine costs are backflushed.

About backflushing materials

You can designate multiple backflush locations for the same material. You specify the backflush location at the material level. With this method, you can manufacture one item on two production lines, each of which has different backflush locations specified.

Hierarchy of backflush locations

There are four levels of backflush locations. You do not have to use all four levels, but you must designate at least one backflush location if you plan to backflush the material. The system checks each level in a particular sequence; if the first level is blank, it moves on to the next level, and so on:

1. The first level the system checks is the **Backflush Location** field on the **Materials** form. If the specified location does not exist for the item, the system creates the location record automatically and then backflushes from it.
2. If the material's **Backflush Location** field is blank, the system searches for an item location that references the operation's work center. This is the second level that the system checks.
3. If there is no location associated with the operation's work center, or the work center location does not exist for the item, at the third level the system checks the **Backflush Location** field on the **Controls** tab of the **Items** form.
4. If the **Backflush Location** field on the **Items** form is blank, the system uses the **Backflush Location** specified on the **Inventory Parameters** form as the fourth level.

At any point in this validation process, once you specify a backflush, the system uses that location from which to backflush, regardless of what locations might be set up at a higher level. For example, if the material/operation level has a specified backflush location, the system uses that location during backflushing, regardless of what you set up for the material at the item location/work center, **Items - Controls**, or **Inventory Parameters** levels.



A backflush location cannot be a non-nettable location, nor can it be a transit type location.

This example demonstrates the source of default backflush locations for a production schedule based on this setup:

Form (part)	Field settings
Inventory Parameters form	On Hand Neg Flag: Selected Backflush Location: Floor
Items form - Controls tab (AL-10000)	Backflush: Selected Backflush Location: Bin
Item location/work center	Work center: AS-500

Floor stock location	Floor stock location: A1
Production Schedule Material form (AL-10000)	Backflush: Selected Backflush Location: Z3

A production schedule has operation 10 that goes through work center AS-500. That operation uses material AL-10000. The system checks the material level first and then backflushes from location Z3. If there is no backflush location at this level, the system proceeds to the next level and then backflushes from location A1 at the item location/work center level.

If there were no item location/work center or floor stock level default, the system will check the Items – Controls form level for a backflush location (in this case Bin) and backflush from there.

Finally, if no default location is specified at the Items - Controls tab level, the system will use the default value from the Inventory Parameters form and backflush from the default, "Floor" location.

Inventory parameters

To use backflushing, there are a couple of settings that must be made on the Inventory Parameters form. These parameters are:

- On Hand Negative Flag
- Backflush Location

These inventory parameters are set on the Inventory Parameters form located in the Master Explorer > Modules > Codes > Parameters folder. Selecting the “On Hand Neg Flag” check box allows inventory transactions to take on-hand quantities below zero. Otherwise, inventory quantities will never be taken below zero which will prevent backflushing processes. A Backflush Location can also be selected on this form that identifies the default stock location from which all backflushed material will be withdrawn.

After making changes to the form be sure to click Save on the toolbar.



If you leave the backflush location at all four levels blank, you cannot perform backflushing. The system displays an error message when the “On Hand Neg Flag” check box is selected on the Inventory Parameters form and you did not indicate a backflush location. In this situation, you must specify a backflush location at some level in the hierarchy in order to backflush.

Items form - Controls tab

You can set up materials to be backflushed by selecting the **Backflush** check box on the **Controls** tab of the **Items** form. You can override this setting for each material on the BOM.

An item can be set for backflushing by opening the Master Explorer > Modules > Material > Inventory > Items form, Controls tab for the specific item. Selecting the Backflush check box indicates that this item can be backflushed. This check box is activated only if the “On Hand Negative Flag” check box on the Inventory Parameters form is selected.

A Backflush Location can also be selected from the drop-down list on this tab. This field is activated only when the Backflush check box is selected. You may also elect to leave this field blank.

After making any changes to the form, be sure to save the record.



The backflush item and control point settings from the work center display default values from one of the operations forms (**Current Operations**, **Production Schedule Item Operations**, and **Production Schedule Release Operations**) that specify that work center. However, on the operations form, you can override the default values for the backflush item and backflush location.

Backflushing materials

You must establish a routing, comprised of operations, before you can attach materials to it. On the Operations form, you indicate what is backflushed - labor, machine, both, or neither. You can also specify whether the operation is a control point.

On the Materials form, you can define whether an item is backflushed and a location from which to backflush it.



If you will be using the Floor Stock Replenishment Report, it is better to leave the backflush location blank on the material level. Otherwise, you must set up the backflush location on the material level to be the same as the item location/work center level.

The BOM and the location hierarchy, which you set up, control the materials to be backflushed and the backflushing location used for each material. See *Hierarchy of backflush locations* earlier in this lesson.

When you post quantities for completed transactions or report scrap, backflushing occurs automatically. The quantity of the components backflushed is based on the quantity complete or scrapped quantities, multiplied by the quantity per piece defined on the BOM. Components that you have previously backflushed or manually issued are not considered for the current transaction.

For repetitive manufacturing, the system uses the production schedule release BOM for backflushing materials.

Use control points to manage the number of operations backflushed by a single transaction.

The system creates material transactions and inventory journal transactions with appropriate costs based on the cost method used. The system creates a material issue transaction each time material is backflushed.



Demo: Set up backflushing and control points

Your instructor will demonstrate how the setup of backflushing and control points is done for repetitive manufacturing.



Demo steps

1. Select **Master Explorer > Modules > Codes > Parameters > Inventory Parameters**. The **Inventory Parameters** form opens.
2. View the settings for the **On Hand Negative Flag** check box and the **Backflush Location** field. (On Hand Negative Flag field is selected, Backflush Location field set to FLOOR)
3. Select **Master Explorer > Modules > Material > Inventory > Items**. The **Items (Filter In Place)** form opens.
4. Click **Filter In Place**.
5. Select item **MB-10000-Bicycle,Model-180,Mountain,Black/White** from the list in the left pane.
6. Click the **Controls** tab.
7. View the settings for the **Backflush** and **Backflush Location** fields.



The Backflush check box is cleared and the Backflush Location field is empty.

8. Click **Current Materials**. The **Current Materials (Linked)** form opens.
9. Select each of the materials from the list in the left pane and view the settings for the **Backflush** and **Backflush Location** fields.



The Backflush check box is selected for all materials and the Backflush Location field is empty for all materials.

10. Close the **Current Materials (Linked)** form.
11. Click **Operations**. The **Current Operations (Linked)** form opens.
12. Select each of the operations from the list in the left pane and view the settings for the **Backflush** field and the **Control Point** check box.



The Backflush field is set to BOTH for all operations and the Control Point check box is selected only for operations 20 and 40.

Note: The Backflush field is set to BOTH for all operations and the Control Point check box is selected only for operations 20 and 40.

13. Close the **Current Operations (Linked)** form.
14. Close the **Items** form.
15. Select **Master Explorer > Modules > Production > Work Centers > Work Centers**. The **Work Centers (Filter In Place)** form opens.
16. Click **Filter In Place**.
17. Select these work centers from the list in the left pane and view the settings for the **Backflush** field and the **Control Point** check box for each.
 - a. **PS-FIN** (Backflush field = BOTH, Control Point check box = cleared)
 - b. **PS-HUB** (Backflush field = BOTH, Control Point check box = cleared)
 - c. **PS-FRM** (Backflush field = BOTH, Control Point check box = selected)

- d. **PS-HUB** (Backflush field = BOTH, Control Point check box = cleared)
 - e. **PS-PKG** (Backflush field = BOTH, Control Point check box = selected)
18. Close the **Work Centers** form.

Check your understanding



List the four levels of backflush locations in the sequence that the system will check for a valid backflush location.





Which of the following statements completes this sentence? _____ are used to manage the number of operations backflushed by a single transaction.



- a) Bill of material
- b) Work center resources
- c) Control points
- d) Inventory parameters



Which of the following activities needs the On Hand Negative Flag setting activated on the Inventory Parameters form?



- a) Backflushing material
- b) Adding items to a production schedule
- c) Recording a production schedule complete transaction
- d) Processing a quantity adjustment



Lesson 4: Creating standard bills of materials (BOMs) for repetitive items

Estimated time

50 minutes

Learning objectives

After completing this lesson, you will be able to:

- Describe the process to create a current BOM for a production item in repetitive manufacturing.
- Determine the “Pieces per Hour” rate for a routing operation.
- Identify the utilities and the sequence they are used to create a standard BOM.

Topics

- Introduction
- Copying routings and BOMs
- Creating a current BOM
 - Current operations
 - Adding materials to an operation
 - Setting up run durations for a cell or line
 - Determining the pieces per hour rate
 - Examples
- Creating a standard BOM
 - Current Bill of Material Processor utility
 - Current BOM Cost Roll Up utility
 - Roll Current Cost to Standard Cost utility
 -

Introduction

The use of production schedules requires accurate bills of materials (BOMs) to correctly record transactions when backflushing. Before using production schedules, the following BOMs are required:

Production schedule BOMs

Standard BOM

Production schedule transactions post costs to the journal using a standard BOM, and post actual values, which are accumulated at the work center, using the production schedule BOM.

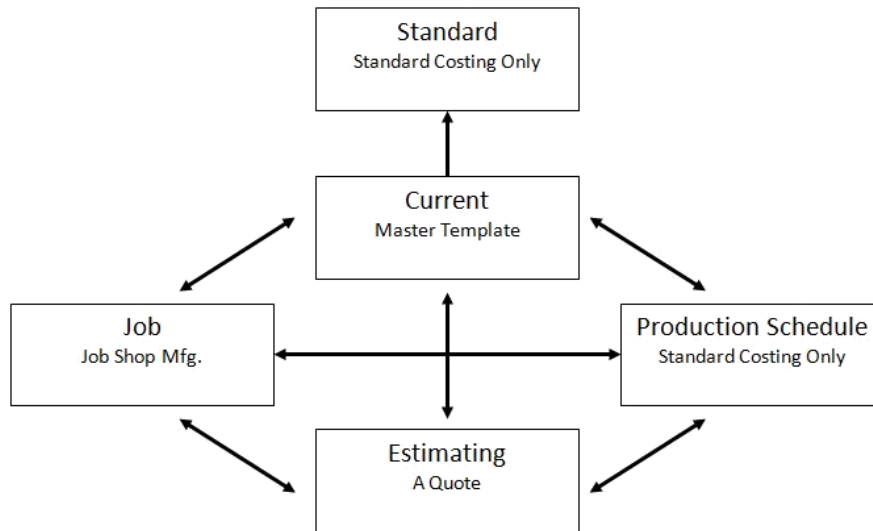
- Production schedule BOMs can be created in the following ways:
- Manually add each operation and material record
- Copy from a variety of BOM types using the Copy Routing/BOM activity
- Copy from current BOM type when you release a line

A standard BOM is created by using the Roll Current Cost to Standard Cost utility. The current BOM for each of the production items must be accurate in order for the standard BOM to be accurate.

In this lesson, you will learn how to copy a BOM, create a current BOM, and use various utilities to create a standard BOM.

Copying routings and BOMs

You can freely copy back and forth between the current, job, estimate, and production schedule BOMs using the Copy Routing/BOM activity. You can also use the actual values from jobs versus those planned on a BOM. Once you copy a BOM, you can edit the new copy of the routing and bill of materials as necessary.



BOM types – Arrows represent copy directions

Copy Routing BOM form

It is possible to have several routings and BOMs for the same item. You could have a routing and BOM for a current item, a production schedule, and a job that were each unique, but all for the same item. This allows for the flexibility to accommodate differences when manufacturing an item as a job or as a production schedule.

To copy a routing/BOM, you first open the Copy Routing BOM form. You then select or enter appropriate data in the fields on the form to specify the elements of a routing or BOM that you want to copy. Use the table below as a guide for the usage of the various fields. When you have finished selecting or entering data, click Process to complete the copy activity.



Many of the fields on the form are grouped into sections: the “From” section on the left side of the form and the “To” section on the right side. This allows you to set a source and a destination or target for various elements in the copy activity.

Field	Description
From Category	<p>In this field you select the code to specify the source of the copy for the routing and the bill of materials (BOM). Options include:</p> <p>Job: to copy the setup and run hours shown on the Standards tab on the Job Operations form and the material quantities and material costs shown on the Materials tab on the Job Materials form.</p> <p>Current: to copy the item current routing and BOM from the Items form.</p> <p>Actual Job: to copy the actual, posted setup and run hours and actual material quantities and costs from the job. These values were posted through job transactions after the job was run and are shown on the Accum Values tab of the Job Operations and Job Materials forms.</p> <p>Estimate Job: to copy the routing and BOM from an estimate job.</p> <p>PS Item: to copy the routing and BOM from a production schedule item.</p> <p>PS Release: to copy the routing and BOM from a production schedule release.</p> <p>The category selected in this field determines which other fields on the form are available or required.</p>
To Category	<p>In this field you will select the code to specify the target of the copy for the routing and the bill of materials (BOM). Options include:</p> <p>Job: to copy the routing and BOM to a job.</p> <p>Current: to copy the routing and BOM to a target item's current routing.</p> <p>Estimate Job: to copy the routing and BOM to an estimate job.</p> <p>PS Item: to copy the routing and BOM to a production schedule item.</p> <p>PS Release: to copy the routing and BOM to a production schedule release. The release you are copying to must exist, must have a status of Planned or Released, and must not have any posted production schedule transactions against it.</p> <p>When a job or production schedule has a status of Released, a message displays indicating that you are adding operations to a released job or production schedule.</p>
Job	<p>In the From section, the number of the job or estimate from which the information will be copied is typed or selected.</p> <p>In the To section, type or select the number of the job or estimate to which the information will be copied.</p> <p>Notes:</p> <p>If you leave this field blank, the next available job number will be used (this number will display at the conclusion of the copy process).</p> <p>If the job number in the To section has a released status, the existing routing and bill of materials cannot be modified. However, additional routings and bills of material can be added to the end of the existing routing.</p>

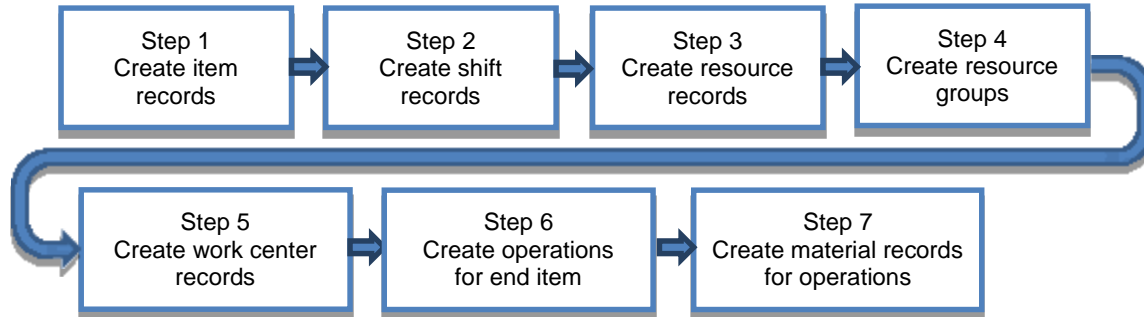
Field	Description
Sched ID	<p>In the From section, you can type or select a valid production schedule ID from which the information will be copied.</p> <p>In the To section, you can type or select a valid production schedule ID, a new production schedule ID, or leave it blank and let the system create a new production schedule ID.</p>
Rework	<p>If the displayed job is a rework order, the Rework check box will be selected by default.</p> <p>Notes:</p> <p>If the target job (or estimate job) displayed in the To section is a rework order, you can copy a material to the job BOM that is the same as the job's end item. This recursive BOM structure is allowed only for rework jobs.</p> <p>You cannot copy a job structure to a new job if the job BOM contains a sub-job that is a rework order.</p> <p>You cannot copy materials from a rework order to a current BOM.</p>
Item	<p>In this field you can select the item from which to copy the current routing. It must be an inventoried item.</p>
Release	<p>In this field you can select the due date of the production schedule release from which to copy the routing/BOM information.</p>
Revision	<p>This field is where you would type the revision number of the item.</p>
Starting and Ending Operation	<p>You can specify the range of operations to copy. The default will be the starting and ending operation numbers from the job, production schedule, or current routing. These fields can be overwritten as needed.</p>
Copy UET Values	<p>To copy any existing User Extended Table (UET) values from the source routing/BOM, you can select this check box.</p>
Copy Indented BOM	<p>The default setting in this field is No. However if you select Yes, you are able to copy the BOM and create sub-jobs for any current subassembly materials within the BOM that have a Reference of Job.</p> <p>Note: When you first create the sub-jobs in this manner, the Start and End dates on those jobs will be blank. The next time you run APS Planning, the system will populate these dates based on the current plan data. If you are using MRP, you must run Scheduling to populate the blank dates on the sub-jobs.</p>
Extend by Scrap Factor	<p>The default setting is No. If you select Yes, the scrap factor displayed on the Current Materials form will be used as the variable for increasing the quantity on sub-jobs.</p>

Field	Description
Option	<p>In this field you are able to select a destination for routings and BOMs being copied or you can accept the default of Insert Range.</p> <p>Delete All: Deletes the information specified. In the routing example, this option does not re-sequence the operation numbers.</p> <p>Insert Range: Inserts the information and re-sequences the operation numbers. For example, if you copy a routing with Operations 10, 20, 21, and 22 to a blank routing, the Insert Range option re-sequences the numbers to 10, 20, 30, and 40.</p> <p>Replace Range: Replaces existing information. In the routing example, this option does not re-sequence the operation numbers.</p> <p>On some forms, this field is disabled if the copy "TO" field is left blank.</p>
Labor, Material, or Both	<p>The default setting is Both. This field is used to further define what portion of a routing to copy.</p>
After Oper	<p>In this field you can specify the operation number after which to insert the new routing.</p>
Effective	<p>This field is where you can select a date to copy only non-expired BOMs or accept the default of the current system date.</p>
Copy to PS Release BOM	<p>Selecting this check box will copy the production schedule item's routing/BOM to any of the production schedule item's releases that do not have a routing/BOM.</p> <p>If the PS item does not contain a routing/BOM, the item's current routing/BOM will be copied to the releases.</p> <p>This field is active only if you have selected PS Item in the To Category field.</p>



Creating a current BOM

As a reminder, the diagram below depicts the procedural steps for creating a BOM.



Creating a BOM – procedural steps

We will be focusing on steps 6 and 7 in this lesson.

Current operations

An operation specifies the times, resources required, and costs of a manufacturing process step.

When creating or modifying current operations, you can use two forms:

Engineering Workbench

Current Operations form

To create operations for an end item, open the Master Explorer > Modules > Material > Product Definition > Current Operations form and enter or select information as needed on the various tabs of the form.

Use the Standards tab to maintain or view routing requirements for an item. Refer to the table below for the field descriptions for the Standards tab.

Use the Resources tab to maintain the list of resource groups that can work on this operation. An operation must specify at least one resource group.

Use the Costs tab to maintain cost rates of the operations.

Note: In this course, we do not go into detail about all the scheduling, planning, and costing fields on the Current Operations form.

Current Operations – Standards tab field descriptions

Field	Field Settings
Fixed Schedule fields	
Use Fixed Schedule	Selecting the Use Fixed Schedule field will allow you to set a fixed time for this operation regardless of lot size. Selecting this field will also update the Scheduler Rule on the resources tab.
Fixed Sched Hours	If the Use Fixed Schedule check box is selected, use this field to enter the expected total amount of time for the operation. When you use fixed hours, the Scheduler will ignore the values you have in the hours/piece and setup fields. The processing time for the operation will include:

Field	Field Settings
	Fixed Sched Hours Move hours Queue hours Finish hours
Hours/Piece fields	
Machine Hours per Piece	This field indicates the estimate of the hours of run time to produce one piece. If Sched Driver field = Machine, then enter a value in this field or in the Pieces per Machine Hour field.
Pieces per Machine Hour	This field represents the pieces that can be produced in a single machine hour. If Sched Driver field = Machine, then enter a value in this field or in the Machine Hours per Piece field.
Labor Hours per Piece	The value in this field is an estimate of the hours of cycle time to produce one piece. If Sched Driver field = Labor, then a value should be entered in this field or in the Pieces per Labor Hour field.
Pieces per Labor Hour	This field represents the pieces that can be produced in a single labor hour. If Sched Driver field = Labor, then a value should be entered in this field or in the Labor Hours per Piece field.
Sched Driver	This field will either have a value of Labor or Machine.
Run Duration	This field displays the processing time (adjusted for efficiency) for the operation that advanced planning and scheduling (APS) and the Scheduler will use to plan or schedule the resources for this operation. The system divides the Machine Hours Per Piece or Labor Hours Per Piece value by the number of resources from the Schedule Driver resource group type, and multiplies the value by (100 / Efficiency).
Yield	This field shows the percentage amount you expect to finish at this operation. An item's shrink factor is linked to the yield amount. When the yield is changed for one or more operations for a given item, that item's shrink factor is recalculated. When the shrink factor is changed, the yield on the last operation on the item's routing is updated.
Hours fields	
Move	The field displays the time of movement of work in progress (WIP) from the previous operation to this operation.
Queue Time	This field will display the estimated amount of time you expect the item to wait before being processed at this operation.
Setup	The field contains the time required to set up this operation.
Finish	The value of this field is the delay between completion of this operation and the start of the next operation in the routing.
Use Offset	Selecting this check box allows this operation to start before the previous operation completes. This allows overlapping operations, which is often used with assembly lines and cells. Note: This is not a setting for parallel processing.

Field	Field Settings
Offset Hours	<p>In this field you can enter the hours that will be used in the offset load splitting calculation. Various activities use offset hours as follows:</p> <p>APS. Offset is time-based. APS starts the operation the specified number of hours AFTER SETUP BEGINS on the previous operation. For example, one hour of offset means the planner begins the operation with an offset of one hour after setup starts on the previous operation.</p> <p>Scheduler. Offset is load-based. The Scheduler splits the load at the operation into smaller loads when setup finishes. When these smaller loads finish at the operation they move independently to the next operation. The size of these smaller loads depends on the offset hour size and the hours per piece or fixed time.</p> <p>Lead Time Processor. Offset is time to wait. Reduces total lead time by the offset hours.</p>



All times should be entered as hours in decimal format. For example, an expected setup time of 45 minutes (45/60) is entered as 0.75.



Adding materials to an operation

A material specifies the items required to perform a given operation.

To add materials to an operation, you start by clicking the Materials button on the Current Operations form. This will open the Current Materials form. Refer to the descriptions in the table below for fields on the Materials tab. After entering data you should save the record.

Current Materials form – Materials tab field descriptions

Field	Description
Material	This is a required field where you select the material to be added to the operation from the drop-down list. This can be an inventoried or non-inventoried Item. The system will apply cost per unit for inventoried items. Non-inventoried items might be supply items that will not directly affect costing of the job. These charges could be captured in the overhead accounts.
Quantity	This field is where you enter the number of units of this material required per unit or lot to manufacture the item.
Per Lot Quantity/Unit	These radio buttons indicate if the quantity needed of the material is per unit or per lot. If per lot is selected, then the planner calculates one item to be used for the whole job regardless of the quantity of the parent item to be produced or the lot size on the parent item record.
Scrap Factor	<p>The field shows the percentage of expected scrap incurred during manufacturing for the component material. This percentage should be expressed as a decimal, e.g. 10% is entered as "0.1," not "10." When using a scrap factor the total quantity is calculated as:</p> <ul style="list-style-type: none"> • Total Quantity = Quantity * (1 - Scrap Factor)
Probable	<p>This field is the percentage of probability that this component will be used in the manufacturing of the product.</p> <p>This field is unavailable if the configuration flag is not selected.</p> <p>If the configuration flag for this item is selected, then the quantity will be calculated as:</p> <ul style="list-style-type: none"> • Total Quantity = Quantity * Probable <p>Deliberate over-planning and under-planning are allowed.</p>
Effective	If there's a date in this field, the planner will ignore this operation or material previous to the effective date. The default of a blank date turns this feature off. This field will appear only on the Current Operations and Current Materials screens.
Obsolete	If there's a date in this field, the planner will ignore this operation or material after the date set. The default of a blank date turns this feature off. This field will appear only on the Current Operations and Current Materials screens.
Backflush	You can select this check box if the material is to be backflushed. This field defaults to what was selected on the Controls tab of the item record.
Backflush Location	<p>This field can be updated only if the Backflush check box has been selected. If left blank, the system checks the hierarchy during the backflushing process to obtain a backflush location. At any point in the validation process that the system encounters a valid backflush location it will use that location and ignore any other values set at higher levels. The order in which the system validates a backflush location is:</p> <ol style="list-style-type: none"> 1. Current/Job/Production Schedule Materials 2. Floor stock locations for item at the operations work center 3. Item Maintenance - Controls 4. Inventory Parameters.
Alt Group	This field is used when defining a group of alternate materials for an operation. See the Specifying alternate materials topic later in this lesson.



Exercise 4.1: Create a current BOM

In this exercise, you will manually create a current BOM for one production item, and copy a current BOM to the current BOM for the other production item.

Exercise instructions

Current BOMs to support the manufacturing of each of the two handlebar production items are required. Both handlebars will use the same aluminum tubing, item ZAL-200, and will have similar routings.

Exercise 4.1 steps

Part 1: Create a current operation record for item TA-30000 and add a current material record to operation 10

1. Select **Master Explorer > Modules > Material > Product Definition > Current Operations**. The **Current Operations (Filter In Place)** form opens.
2. Click **Filter In Place**.
3. Click **Create a new object in the current collection**.
4. Type *TA-30000* in the **Item** field.
5. Select **H-CUT** from the **WC** (work center) drop-down list.
6. Type *0* in the **Move** (hours) field.
7. Click **Save**.
8. Click **Create new object in the current collection**.
9. Select **H-FORM** from the **WC** (work center) drop-down list.
10. Type *0* in the **Move** (hours) field.
11. Clear the **Control Point** check box, if it is not already cleared.
12. Click **Save**.
13. Click **Create new object in the current collection**.
14. Select **H-FIN** from the **WC** (work center) drop-down list.
15. Type *0* in the **Move** (hours) field.
16. Select the **Control Point** check box, if it is not already selected.
17. Click **Save**.
18. Select **TA-30000 Operation 10** from the list in the left panel of the screen.
19. Click the **Materials** button. The **Current Materials (Linked)** form opens (linked to operation 10 of item TA-30000).
20. Select **ZAL-200** from the **Material** drop-down list.



The **Backflush** check box should be selected (default from the **Items** form).

21. Type *2* in the **Quantity** field.
22. Click **Save**.

23. Click the **X** on the tab of the **Current Materials (Linked)** form to close the form.

Part 2: Copy the current BOM to item TA-31000 and update the material record for operation 10 of the BOM by increasing the quantity of the material ZAL-200 to 3 feet.

1. Select **Master Explorer > Modules > Material > Product Definition > Activities > Copy Routing BOM**. The **Copy Routing BOM** form opens.
2. Select **Current** from the **From Category** drop-down list, if it is not already selected.
3. Select **TA-30000** from the **From Item** drop-down list.
4. Select **Current** from the **To Category** drop-down list.
5. Select **TA-31000** from the **To Item** drop-down list.
6. Click **Process**. A dialog box opens with the message, “[Copy Routing BOM] was successful.”
7. Click **OK**.
8. Close the **Copy Routing BOM** form.
9. Make sure that the **Current Operations** form is the active form and click **Refresh the current collection**.

The three operations for the TA-31000 that were copied should now be listed.

10. Select **TA-31000 Operation 10** from the list in the left panel of the screen.
11. Click the **Materials** button. The **Current Materials (Linked)** form opens (linked to operation 10 of item TA-31000).
12. Type 3 in the **Quantity** field.
13. Click **Save**.
14. Close the **Current Materials (Linked)** form.
15. Close the **Current Operations** form.

Part 3: Assign the item stockroom location

1. Select **Master Explorer > Modules > Material > Inventory > Item Stockroom Locations**. The **Item Stockroom Locations** form opens.
2. Select **MAIN** from the **Warehouse** drop-down list.
3. Type *ZAL-200* in the **Item** field.
4. Click **Filter In Place** on the toolbar to filter the collection for the **ZAL-200**.
5. Click **Create new object in the current collection**.
6. Select **H-CUT Floor Stock** from the **Location** drop-down list.
7. Click **Save modified data and close form (OK)**.



Setting up run durations for a cell or line

A cell or production line is comprised of a number of workstations, material buffers, and material transport mechanisms that connect them.

A cell can be set up in a number of ways – as separate operations requiring separate resource groups, as one operation requiring a set of resources, or a mix of both.

Regardless of how the resources are configured, it is important to make sure that the run duration for an operation reflects the “rate per day” that is set on the Items form.

The Run Duration field on the Current Operations form displays the processing time (adjusted for efficiency) for the operation that advanced planning and scheduling (APS) and the Scheduler will use to plan or schedule the resources for an operation.

Calculation

To calculate the run duration for an operation, the system divides the value of “Machine Hours per Piece” or “Labor Hours per Piece” by the number of resources from the schedule driver resource group type, and multiplies the value by (100 / Efficiency).

$$\text{Run Duration} = (\text{Hours per Piece}) / (\text{Total Quantity of Required Resources}) \times (100/\text{Efficiency})$$

In the formula ...	The scheduler uses ...
Hours Per Piece	Hours per Piece value that matches the schedule driver – for example, if schedule driver = “Labor,” then “Labor Hours per Piece” is used.
Total Quantity of Required Resources	Quantity of those resource groups with a resource type that matches the schedule driver – for example, if an operation is assigned two labor resource groups and one machine resource group, then if the schedule driver = “Labor,” the value used is two.
Quantity in Load	Uses the job quantity, or if the operation has a split size, it uses the split size quantities.

Examples

Schedule driver	Hours per piece	Total quantity of required resources	Scheduled run time per piece
Crew	10 labor hr/pc	1 crew	10 hrs/pc for this resource
Crew	10 labor hr/pc	2 crew	5 hrs/pc for both resources
Crew	10 labor hr/pc 5 machine hr/pc	2 crew 1 machine	5 hrs/pc for both crew and the machine
Machine	10 labor hr/pc 5 machine hr/pc	2 crew 1 machine	5 hrs/pc for both crew and the machine



You must think carefully about how you want the Scheduler to allocate your resources and determine if it's most appropriate to use the resource group Quantity field or the Split Size field.

Let's use an example of four crew members at a work center. The table below shows the effect of using each field.

If Labor Hours/Pc equals...	And you set...	Then the scheduled run time per piece is...	And the scheduler will work on a load...
4	Resource Group Qty = 4 Split size= 0	1 hour	Only when all four resources are available
1	Resource Group Qty = 1 Split size >= 0	1 hour	When any one of the four resources is available

Determining the pieces per hour rate

When you set up the production items in an earlier exercise, you specified a manufacturing rate per day on the Items form.

The Pieces per Hour and Resources Quantity fields on the operations form of the production item's routing need to be adjusted so that production rate is represented in the Run Duration field. Perform the calculations below to determine these values.

$$\text{Pieces per Hour} = (\text{Rate per Day}) / (\text{Hours in Day}) / (\text{Resource Quantity for Operation})$$

$$\text{Rate per Hour} = (\text{Rate per Day}) / (\text{Hours in Day})$$

$$\text{Rate per Resource Hour} = (\text{Rate per Hour}) / \text{Resource Quantity for Operation}$$

The key is to remember that the Pieces per Hour field is **not** referring to the number of pieces the operation produces in an hour. It is referring to the **number of pieces finished per resource hour**.

For example, if an operation runs 10 hours per day, that operation can produce 50 pieces per day. That means it produces 5 pieces per linear hour of time.

But if there are five resources working in parallel on that operation, then you actually incur 5 labor hours or 5 machine hours for those five pieces produced in a linear hour. The value in the Pieces per Hour field needs to show the number of pieces that are produced per resource hour. In this case, the operation produces one piece for every resource hour.

If your line isn't perfectly balanced, you may just want to focus on the bottleneck operation and set the rate for all operations in a cell or line equal to the rate at the bottleneck.

Here is an example of using a Microsoft® Excel spreadsheet to enter data and calculate pieces per hour for an operation.

F3 fx =C3/D3/E3					
A	B	C	D	E	F
				Resources Required	Pieces/Hour
	Item	Rate / Day	Hours / Day		
	TA-30000	50	8	1	6.25
	TA-31000	30	8	1	3.75

Microsoft® Excel spreadsheet used to determine pieces per hour rates

Examples

Here are a number of examples for setting these values for various situations.

Example 1: Single resource at 10 per hour

You can create a cell by simply designating a group of machines or operators or areas as a single resource. In this example you have one resource representing the cell (which could be made up of all the machines and crew members at a cell).

Setting	Value
Item Rate/Day	160
Number of operations	One, operation 10
Resource quantity required for operation	1 of 1
On-shift hours for all resources each day	16

Setting	Value
Pieces per hour for operation	10
Run duration for operation	6 minutes

Here are the values plugged into the formula.

Rate per Day	Divided by: Hours in Day	Divided by: Total Resources Running In Parallel	Equals: Pieces per Hour
160	16	1	10

Example 2: Multiple resources processing serially at 10 per hour

You can create a cell and track each work center separately. In this scenario, you have three resources representing the three parts of the cell that run serially.

Setting	Value
Item Rate/Day	160
Number of operations	Three:10, 20, & 30
Resource quantity required for operation 10	1 of 1
Resource quantity required for operation 20	1 of 1
Resource quantity required for operation 30	1 of 1
On-shift hours for all resources each day	16

Setting	Value
Pieces per hour for operation	10
Run duration for operation	6 minutes

Here are the values plugged into the formula.

Rate per Day	Divided by: Hours in Day	Divided by: Total Resources Running In Parallel	Equals: Pieces per Hour
160	16	1	10

In this case, when you run the first piece, it will take 18 minutes before you get a finished item, but after that you will be running at a rate of 10 pieces per hour or 160 per day.

Example 3: Multiple resources processing parallel at 10 per hour

You can create a cell and track each work center separately. In this scenario, you have two resources that run parallel.

Setting	Value
Item Rate/Day	160
Number of operations	One: 10
Resource quantity required for operation 10	1 of 2
On-shift hours for all resources each day	16
Pieces per hour for each operation	5
Run duration for each operation	12 minutes

Here are the values plugged into the formula.

Rate per Day	Divided by: Hours in Day	Divided by: Total Resources Running In Parallel	Equals: Pieces per Hour
160	16	2	5

Example 4: Multiple resources processing serial and parallel at 10 per Hour

You could also model this as two operations: one to represent the rate you load a line or cell, the second to represent the line or cell itself. The first and second operations run serially. But the resources in operation 20 run parallel. You would have five resources at operation 20 in this example.

Setting	Value
Item Rate/Day	160
Number of operations	Two: 10 and 20
Resource quantity required for operation 10	1 of 1
Resource quantity required for operation 20	1 of 5
On-shift hours for all resources each day	16
Pieces per hour for operation 10	10
Run duration for operation 10	6 minutes
Pieces per hour for operation 20	2
Run duration for operation 20	30 minutes

Here are the values plugged into the formula for operation 10:

Creating a standard BOM

You cannot add, delete, or update a standard BOM directly. You must copy the operations and materials from the current BOM. To create a standard BOM from an item's current BOM, you must run the following utilities:

Current Bill of Material Processor
Current BOM Cost Roll Up
Roll Current Cost to Standard Cost

Current Bill of Material Processor utility

The Current BOM Cost Roll Up utility uses item low level codes in its processing. During the period, you may have changed some aspect of your BOM that affects an item's low level code. If you do **not** have the Low-Level On Line check box selected on the Inventory Parameters form, then you will need to run this utility to update an item's low level code.

Current BOM Cost Roll Up utility

During the period, you may have changed some aspect of your BOM that affects item cost. Use this utility to calculate the cost of the current BOM as it now is. This utility updates the costs for all current BOMs and the current costs for manufactured items.

Roll Current Cost to Standard Cost utility

Once the current operations and current materials are set up for the production items, you must use the Roll Current Cost to Standard Cost utility to complete a standard BOM for each of the production items in repetitive manufacturing.

This utility will copy current costs to standard costs, post any transactions necessary to revalue inventory, and copy the current BOM to the standard BOM record.

First, open the Roll Current Cost to Standard Cost form. Use the following fields to filter the BOMs that you want to copy.

Starting and Ending Product Code
Starting and Ending Item
Source
ABC Code
Cost Method
Material Type

Then, click Preview to view a listing of the current BOMs that will be copied, and adjust field filters as needed. Finally, select the Post check box and click Print to complete the activity.



Demo: Create a standard BOM

Your instructor will demonstrate the process for creating a standard BOM from a current BOM.





Exercise 4.2: Create a standard BOM

In this exercise, you will complete the processes needed to create standard BOMs for repetitive manufacturing production items.

Exercise instructions:

To complete the setup of the routings and bills of material for the two types of handlebars, we must roll the current routing and bill of material to the standard routing and bill of material for each of the production items.

Exercise 4.2 steps

Part 1: Run the Current Bill of Material Processor utility for items TA-30000 and TA-31000

1. Select **Master Explorer > Modules > Material > Product Definition > Utilities > Current Bill of Material Processor**. The **Current Bill of Material Processor** utility opens.
2. Click **Process**. A dialog box opens with the message, “[Current Bill of Material Processor] was successful.”
3. Click **OK**.
4. Close the **Current Bill of Material Processor** form.
5. Part 2: Run the Current BOM Cost Roll Up utility for items TA-30000 and TA-31000
 1. Select **Master Explorer > Modules > Material > Product Definition > Utilities > Current BOM Cost Roll Up**. The **Current BOM Cost Roll Up** utility opens.
 2. Select the **List During Processing** check box.
 3. Click **Process**. A dialog box opens with the message, “[Current BOM Cost Roll Up] was successful.”
 4. Click **OK**.
 5. Close the **Current BOM Cost Roll Up** form.

Part 2: Preview and then copy (commit) the current BOM to the standard BOM for both items, using the Roll Current Cost to Standard Cost utility

1. Select **Master Explorer > Modules > Material > Product Definition > Utilities > Roll Current Cost to Standard Cost**. The **Roll Current Cost to Standard Cost** utility opens.
2. Select **TA-30000** from the **Starting Item** drop-down list.

3. Select **TA-31000** from the **Ending Item** drop-down list.
4. Click **Preview**.
5. Review the report output in the **Report Viewer**.
6. Close the **Report Viewer** form.
7. Select the **Post** check box.
8. Click **Print**. A dialog box opens with the message, "Report Submitted."
9. Click **OK**.
10. Click the **X** on the tab of the **Roll Current Cost to Standard Cost** form to close the form.

Part 3: Verify that TA-30000 and TA-31000 have costs in the Std Unit Cost

1. Select **Master Explorer > Modules > Material > Inventory > Item Costs**. The **Item Costs (Filter In Place)** form opens.
2. Type *TA-3** in the **Item** field.
3. Click **Filter In Place**.
4. Click the **Cost Maint** tab.
5. Verify that there are costs associated with item **TA-30000** in the **Std Unit Cost** panel of the **Cost Maint** tab.
6. Select item **TA-31000** from the list in the left panel of the screen.
7. Verify that there are costs associated with item **TA-31000** in the **Std Unit Cost** panel of the **Cost Maint** tab.
8. Close the **Item Costs** form.



Check your understanding



The value of the Run Duration field on the Current Operations form should reflect which value on the Items form?



- a) Variable lead time
- b) Shrink factor
- c) Allocated to production
- d) Rate per day



What does the value in the Pieces per Hour field on the Current Operations form refer to?



- a) Number of pieces the operation produces in an hour
- b) Number of pieces produced per resource hour
- c) Average number of pieces produced in an hour
- d) Maximum number of pieces produced per resource hour



Which type of BOM can create a standard BOM?



- a) Current BOM
- b) Estimating BOM
- c) JOB BOM
- d) Production Schedule BOM



Lesson 5: Creating production schedules

Estimated time

1 hour

Learning objectives

After completing this lesson, you will be able to:

- Order the steps to define a production schedule for repetitive manufacturing.
- Identify the BOMs that are needed for production scheduling and describe the processes in which they are created.

Topics

- Overview
- Creating a production schedule
 - Production schedule header
 - Shop Floor Control Parameters form
 - Production schedule items and releases
 - Generating a production schedule
- Copying a production schedule
- Creating a production schedule BOM
 - Copy BOM buttons
 - Changing status to released
- Creating production schedule item BOMs
 - Production schedule item operations
 - Production schedule item materials
- Creating production schedule release BOMs
 - Production schedule release operations
 - Production schedule release materials

Overview

Production schedules are typically used when you manufacture the same item regularly — standard products — and do not need precise tracking of actual labor and material costs for every job.

Rather than being required to report all activity to a specific job order, production schedules allow activities and their costs to be charged to work centers. Production schedules allow you to authorize and release production in a simplified manner. Production schedules are sometimes referred to as work order-less production.

A production schedule can contain any number of different items and each item can have multiple releases. There are number of ways to create a production schedule. For example, you can:

Manually add a production schedule

Generate a production schedule

Copy from another production schedule

Firm a planned order (using the Materials Planner Workbench)

Once the production schedule is created, you can copy a bill of material routing, using the Copy to Production Schedule Item BOM to copy at the Production Schedule item level. You can also copy routing BOM at the production schedule release level. Once a complete or scrap production schedule transaction has been processed against a production schedule item, the production schedule routing may not be modified.



Creating a production schedule

Production schedules are one means of delivering your manufactured items into finished goods inventory. Production schedules use a rate-based scheduling method. You can use master production schedule to set the build schedule for any given item or you can use normal demand orders and let the planning engine calculate and create planned orders for your build schedule. In either case you will firm the planned orders into a production schedule.

There are three parts to a production schedule:

Production schedule header

Production schedule items

Production schedule releases

Use production schedules to record repetitive or flow-based manufacturing processes.

Order of events

You would take the following steps to track manufacturing through production schedules. To begin, you need to create a production schedule header and then enter the production schedule:

Items

Releases

Routings and BOMs

Transactions



The system displays error or warning messages if you add an item flagged obsolete or slow-moving to a forecast, a planned order, or a master production schedule.



Production schedule header

Use production schedules to track continuous production occurrences that use similar manufacturing processes.

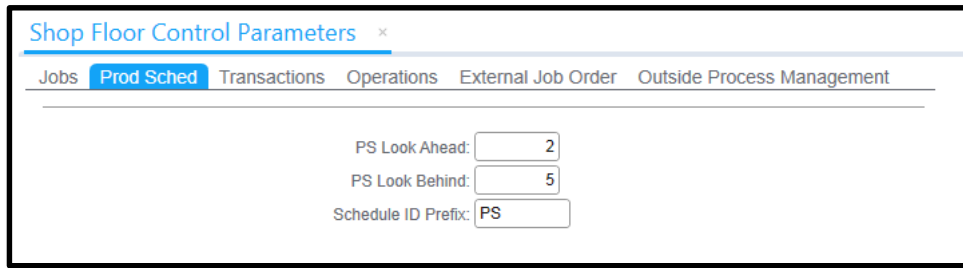
First, you create the header for a new production schedule. Open the Productions Schedules form, add a new record, and enter the appropriate data in the fields on the form. Refer to the table below for field descriptions.

Production Schedules form – header fields

Field	Description
Schedule ID	<p>In this field, you can enter a unique identifier composed of numbers, characters, or a combination.</p> <p>Alternatively, you can enter a global Schedule ID Prefix on the Shop Floor Control Parameters form. The system starts all generated production schedule IDs with this prefix, followed by a sequential number (maximum of ten characters for the combination). Simply leave this field blank to have the system create the new ID when you save the production schedule.</p>
Status	<p>In this field you can change the status code for this production schedule (PS) or accept the default “Planned” status. Valid statuses are:</p> <p>Planned - the default value for new production schedules. A Planned status is used to indicate that the PS has been entered for planning purposes at this time. When a PS is in Planned status, the Scheduler does not recognize it.</p> <p>Released - at least one PS release is now available for production.</p> <p>Complete - the PS has finished production for all production schedule releases. A production schedule’s status may be changed to Complete by manually entering the status change in this field. Upon changing the status to Complete, any load detail records are deleted from the system. You can change a completed PS back to Released status in order to release it again to production for additional work.</p>
Description	<p>The purpose or the process of the production schedule can be described in this text field. The system does not validate this field.</p>
Look Ahead and Look Behind	<p>These numeric fields are used to express the number of days in the past and the number of days in the future from the current day that production can be recorded. These fields are helpful when you do not record production on a daily basis.</p> <p>If these fields are left blank, the system will use the values in the Shop Floor Control Parameters form</p>

Shop Floor Control Parameters form

A few default production schedule parameters can be set on the Shop Floor Control Parameters form.



The screenshot shows a web browser window titled "Shop Floor Control Parameters" with a close button. Below the title bar are several tabs: "Jobs", "Prod Sched" (which is selected and highlighted in blue), "Transactions", "Operations", "External Job Order", and "Outside Process Management". The main content area of the "Prod Sched" tab contains three input fields: "PS Look Ahead:" with a value of "2", "PS Look Behind:" with a value of "5", and "Schedule ID Prefix:" with a value of "PS".

Shop Floor Control Parameters form – Prod Sched tab

This form can be opened by selecting Master Explorer > Modules > Codes > Parameters > Shop Floor Control Parameters. Then select the Prod Sched tab to enter the parameters that affect production schedules.

Schedule ID Prefix

In this field enter the default production schedule ID prefix. You may change the value on the production schedule.

PS Look Ahead

Use this field in conjunction with the PS Look Behind field to specify the range of production schedule releases the system considers when posting transactions. The value is the number of working days to look ahead from the current date.

PS Look Behind

Use this field in conjunction with the PS Look Ahead field to specify the range of production schedule releases the system considers when posting transactions. The value is the number of working days to look behind from the current date.

Example: If you set the PS Look Ahead to 0 and the PS Look Behind to 5, this will cause the system to look for production schedule releases that fall within the last 5 working days from the date on which you record transactions.



Production schedule items and releases

Production schedule items are the finished-goods inventory items that the production schedule produces. They are added to a production schedule using the Production Schedule Items form.

This form is also used to schedule and display releases for the selected production schedule item. This form can be opened in two ways.

Select Master Explorer > Modules > Production > Production Schedules > Productions Schedule Items. Then, select the production schedule ID to which you are adding production items.

Or you can open the form by clicking the Items/Releases button on the Production Schedules form. When you open the form this way, it will display the production schedule ID and the selected item from the Production Schedules form.



An item must have a "Standard" cost type before you can add it to a production schedule.

An item must have a standard BOM before you can change the status of an item line to "Released."

Add an item to the Production Schedule Items form by selecting System > Actions > New and entering the appropriate data in the fields on the form. See the table below for descriptions of the form's fields.



A production schedule may contain multiple items. You cannot add items to a production schedule that has a status of Complete.

Production Schedule Items form – header fields

Field	Description
Schedule ID	You will type or select the production schedule ID from the drop-down list to which you are adding items in this field. Leaving the field blank allows the system to assign an ID.
Item	A valid item number of a standard-costed inventory item is either typed in this field, or selected from its drop-down list.
For Whse	In this field, you can select the warehouse code for the finished goods inventory in this field. The default value comes from the Default Warehouse field listed on the Inventory Parameters form.
Revision	Any finished good item that is affected by an engineering change notice, is detailed with the appropriate revision information in this field. This information is used to report and track inventory that has specific production requirements. When you copy the current routing/BOM to a PS release, the current routing/BOM for this revision is used.

Field	Description
PS Item BOM Exists	This display-only check box is selected automatically when the displayed production schedule item has a production schedule item routing/bill of material. If you have not copied the item current routing to the production schedule item, this check box will be cleared.

Now you can add additional items to the production schedule or create production schedule releases against the new item.

Production schedule releases

A production schedule release is the quantity of a production item that you plan to produce on a specific date. You must create a release schedule for each production item on the production schedule. You can add a release manually or generate multiple releases at one time.

In the Production Schedule Releases grid area of the Production Schedule Items form, add a new line and enter the appropriate data in the required fields:

Due Date - Enter the date for which this production is being planned.

Status - Enter the status or accept the default of Planned.

Released - Enter the quantity to be produced for this particular production occurrence.

Note: Descriptions for these fields and other fields in the grid can be found in the table below.

Save the release and add more releases as needed.

Production Schedule Items form – production schedule releases fields

Field	Description
Due Date	The expected date that the production schedule release is to be received into inventory is typed or entered in the Due Date field.
Completed	This field displays the total quantity of the item posted as complete for the production schedule release. It is updated as a result of entering production schedule complete transactions.
Scrapped	The total quantity posted as scrapped for the production schedule release displays in this field. It is updated as a result of entering production schedule scrap transactions.
Remaining	This field displays the total quantity of the item remaining to be produced for the production schedule release. This field is updated by the system and is equal to the released quantity less the completed quantity.

Field	Description
Status	The status code for the production schedule release is selected in this field or accept the default "Planned" status. Valid statuses are: <ul style="list-style-type: none"> • Planned - the default value for new production schedule releases. A Planned status is used to indicate that the release has been entered for planning purposes at this time. • Released - the production schedule release is now available for production. • Complete – production has finished for the production schedule release. A production schedule's status may be changed to Complete by manually entering the status change in this field. Upon changing the status to Complete, any load detail records are deleted from the system. You can change a completed PS back to Released status in order to release it again to production for additional work.
PS Item Release BOM Exists	This display-only check box is selected automatically when the displayed production schedule release has a unique routing/bill of material. If you have not copied the item current routing or the production schedule item routing/BOM to the production schedule release, this check box will be cleared.
Scheduled	This check box is selected by the system if the production schedule item has been scheduled. It is cleared if the production schedule item has not been scheduled.
Projected	This read-only field displays the projected date that the planning or scheduling functions estimate that the production schedule release will be completed.
Ready	This read-only check box shows whether a demand has any component shortages in the APS plan. If there are no shortages, the field is selected. If shortages exist, the field is not selected.

Note: When you update the status from Planned to Released, the system prompts you to copy a routing (if one does not exist). For a production schedule to have a Released status, it must have a routing.

Generating a production schedule

Use the Generate Production Schedules (Rate Based) form to create production schedule releases for existing production schedules. You can also create new production schedules using this form.

The "Allocated to Production" values on all production schedule materials are updated when you generate production schedules with a status of Released.

Use the **Generate Production Schedules (Rate Based)** form to mass-generate production schedule releases. You should then enter or select appropriate data in the fields on the form. Refer to the table below for field descriptions. Clicking the **Process** button starts the process.

Generate Production Schedules (Rate Based) form – field descriptions

Field	Description
Item	A valid inventory item number is entered in this field.
Quantity	The total quantity of the item you want to release over a period of time should be entered in this field.

Field	Description
Rate/Day	<p>In this field, you can enter the number to be completed per day. The system determines the number of releases to be created for the production schedule based on the total release quantity and the Rate/Day.</p> <p>For example, if you specify a total quantity of 200 and a rate per day of 10, then the activity will generate 20 releases with a quantity of 10 each.</p> <p>This field defaults from the Items form but can be overwritten.</p>
Start Date	<p>The start date is entered in the field or accept the default of the current system date. This is the date scheduling starts. This field is only active when the “Type Forward” radio button is selected.</p>
End Date	<p>The end date is entered in this field. This is the date that production is scheduled to end. This field is only active when the “Type Backward” radio button is selected.</p>
Frequency	<p>The number of days to indicate how often you will generate a schedule or release for this production schedule should be entered in this field. This is specified in the number of manufacturing calendar days. For example, specify "1" for a release to be created every day.</p>
Schedule ID	<p>The next available production schedule ID displays in this field. Use that schedule ID to create a new production schedule with a production schedule item and its releases.</p> <p>You may also select an existing production schedule ID and add items/releases to that production schedule.</p>
Type	<p>The “Forward” radio button should be selected to have the system generate releases forward from the start date.</p> <p>The “Backward” radio button can be selected to have the system generate releases backward from the end date.</p>
Status	<p>The status of the production schedule is selected in this field. Valid statuses, upon creating a production schedule, are Planned and Released. The production schedule must have a released status before any transactions can take place.</p> <p>By specifying a Released status, the system will automatically create the item's production schedule routing and bill of material by copying from the current routing and bill of material.</p>
Copy to PS Item BOM	<p>Select this check box to copy the item’s current routing/bill of material to the production schedule item (if the PS item does not contain a routing/BOM) when you run the activity.</p>
Copy to PS Release BOM	<p>To copy the production schedule routing/BOM of the item to each of the new releases that the activity creates, select this check box. If the PS item does not contain a routing/BOM, the item’s current routing/BOM will be copied to the releases.</p> <p>This check box is active only if the status of the PS item is Planned. If the PS item status is set to Released, this check box is selected automatically and cannot be changed.</p>

Copying a production schedule

Use the Copy Production Schedules form to copy one production schedule to another. The system creates the new production schedule and its associated releases with a status of Planned. The released quantities on the new production schedule equal the released quantities on the original. The completed quantities on the new production schedule equal zero.

To copy a production schedule, begin by opening the Copy Production Schedules form. Then you should enter or select appropriate data in the fields on the form. Refer to the table below for field descriptions. When finished, clicking the **Process** button completes the copy activity.

Copy Production Schedules form – field descriptions

Field	Description
From Schedule ID and To Schedule ID	The production schedule IDs to copy from and to are typed or selected in these fields. If you want to create a new production schedule, you would type a new production schedule ID in the “To Schedule ID” field.
Starting Item and Ending Item	The range of items to copy are entered in these fields. Leave the fields blank to copy all items.
Starting Date and Ending Date	The range of dates on which release lines are to be created are entered in these fields.
Increment Release Dates By	The number of days that indicate how often, in days, the release dates should be generated in the copied production schedule should be typed in this field. This is specified in the number of manufacturing calendar days. For example, specify "1" for a release to be created every day.
Schedule Release Status	The status of the production schedule is selected in this field. Valid statuses, upon creating a production schedule, are Planned and Released. The production schedule must have a released status before any transactions can take place.
Copy BOM	Select "Yes" to copy the routing/BOM to the new production schedule.



After you create a PS release routing/BOM, it remains independent of the corresponding PS item routing/BOM. Changes you make to the PS release routing/BOM are not automatically synchronized to the PS item routing/BOM (and vice versa).



Demo: Create a production schedule

Your instructor will demonstrate how to generate new production schedules.





Exercise 5.1: Create a production schedule

In this exercise, you will generate new production schedules.

Exercise instructions

Now that all the preparation has been completed to prepare our production cell, Progressive Cycles can begin handlebars production starting next Monday. Both handlebars, upright and racing, will be made next week in this cell. List the dates for next week below:

Monday	/	/
Tuesday	/	/
Wednesday	/	/
Thursday	/	/
Friday	/	/

Exercise 5.1 steps

Part 1: Generate a production schedule for item TA-30000 and the TA-31000

1. Select **Master Schedule > Modules > Production > Production Schedules > Activities > Generate Production Schedules (Rate Based)**. The **Generate Production Schedules (Rate Based)** form opens.
2. Select the **Planned** radio button in the **Status** section.
3. Select **TA-30000** from the **Item** drop-down list.
4. Type *250* in the **Quantity** field.
5. Type *50* in the **Rate/Day** field, if the value is not already 50.
6. Select the **Backward** radio button, if it is not already selected.
7. Select the [date for Friday of next week] in the **End Date** field.
8. Type *100* in the **Schedule ID** field.
9. Clear the **Copy to PS Item BOM** check box.
10. Clear the **Copy to PS Release BOM** check box.

11. Click **Process**. A dialog box opens with the message, “[Generate Production Schedules (Rate Based)] will be performed.”
12. Click **OK**. A dialog box opens with the message, “Not one Job Operation exists for Production Schedule Item that has [Schedule ID:100] and [Item: TA-30000]. [Copy] will be performed from Current Operation to Job Operation.”
13. Click **OK**. A dialog box opens with the message, “5 Production Schedule Releases(s) were processed.”
14. Click **OK**.
15. Select **TA-31000** from the **Item** drop-down list.
16. Click **OK**.
17. Type *150* in the **Quantity** field.
18. Type *30* in the **Rate/Day** field, if the value is not already 30.
19. Click **Process**.
20. Click **OK**. A dialog box opens with the message, “[Generate Production Schedules (Rate Based)] will be performed.”
21. Click **OK**. A dialog box opens with the message, “Not one Job Operation exists for Production Schedule Item that has [Schedule ID: 100] and [Item: TA-31000]. [Copy] will be performed from Current Operation to Job Operation.”
22. Click **OK**. A dialog box opens with the message, “5 Production Schedule Releases(s) were processed.”
23. Close the **Generate Production Schedules (Rate Based)** form.

Part 2: Release quantities for TA-30000 and TA-31000

1. Select **Master Explorer > Modules > Production > Production Schedules > Production Schedules**. The **Production Schedules (Filter In Place)** form opens.
2. Click **Filter In Place**.
3. Select **Production Schedule ID 100** from the list in the left panel.



Both production schedule items that you just generated should be listed in the grid on the form.

4. Click **Items/Releases**. The **Production Schedule Items (Linked)** form opens with item **TA-30000** displayed.
5. Click the number in row 3 (Wednesday release) under the **Released** column of the **Production Schedule Releases** grid.
6. Type *100* in the **Released** field in row 3 (Wednesday release) of the **Production Schedule Releases** grid.
7. Click **Save**.
8. Select the second item (**TA-31000**) in the production schedule items list in the left panel of the screen. Item **TA-31000** now displays on the **Production Schedule Items** form.
9. Click the number in row 3 (Wednesday release) under the **Released** column of the **Production Schedule Releases** grid.

10. Type *60* in the **Released** field in row 3 (Wednesday release) of the **Production Schedule Releases** grid.
11. Click **Save**.
12. Close the **Production Schedule Items (Linked)** form. The **Production Schedules** form should now be the active form.
13. Click **Save**.



Creating a production schedule BOM

A production schedule requires both a BOM for each item on the production schedule and a BOM for each release.

The PS item BOM acts as a template for all of the release BOMs when you use the copy buttons on the Production Schedule Items form.

You can create both types of BOMs by:

Manually entering the BOM operations and materials

Using the Copy Routing/BOM activity

Clicking the Copy BOM buttons on the Production Schedule Items form

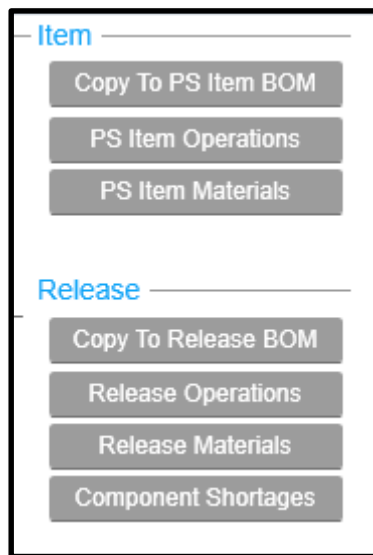
Changing the Status field for any release to "Released." You can do this one-by-one or use the Change Production Schedule Release Status utility to change the status on a range of releases.

Copy BOM buttons

There are two copy BOM buttons on the Production Schedule Items form:

Copy to PS Item BOM

Copy to Release BOM



Buttons on the Production Schedule Items form

Copy To PS Item BOM button

This button copies the item's current routing and bill of material (BOM) to the displayed production schedule item. This action creates a new set of operations and materials that you can modify for this production schedule item. To modify the production schedule item routing/BOM after it is copied, use these buttons:

PS Item Operations

PS Item Materials



If this production schedule item already has a routing/BOM, clicking this button replaces that routing/BOM with the item's current routing/BOM, overwriting any changes you have made. Before you click this button, note whether the PS Item BOM Exists check box is selected.

If there are releases for this production schedule item that do not contain a routing/BOM, the system prompts you also to copy the item current routing/BOM to those releases. If you want to do this, click Yes. Or, if you want to make changes to the production schedule item routing/BOM before copying it to the releases, click No.

Copy to Release BOM button

This button copies the production schedule item's routing/bill of material (if it exists) or the item's current routing/bill of material to the production schedule release that is selected in the grid. To modify the production schedule release routing/BOM after it is copied, use these buttons:

Release Operations

Release Materials



If the selected production schedule release already has a routing/BOM, clicking this button replaces that routing/BOM, overwriting any changes you have made. Before you click this button, note whether the PS Item Release BOM Exists check box (located in the grid) is selected or not.



After you create a PS release routing/BOM, it remains independent of the corresponding PS item routing/BOM. Changes you make to the PS release routing/BOM are not automatically synchronized to the PS item routing/BOM (and vice versa).

Changing status to released

Releasing a line allows transactions to be posted against the production schedule. In order for transactions to be recorded, there must be a routing/BOM for the production schedule release. If a production schedule release does not have a BOM associated to it, the system prompts the user to copy a routing/bill of material from the current BOM when the status is changed to Released.

To change the status to Released for a production schedule item release:

On the Production Schedule Items form, make sure you are working with the production schedule item that contains the release you want to update.

In the grid at the bottom of the form, select the appropriate release and select Released from the Status drop-down list.

You will be prompted to confirm the status change and to copy the PS item routing/BOM (if one exists) or the item current routing/BOM to the PS release.

Change Production Schedule Release Status utility

This utility changes the status of all production schedule releases within a specified range.

To change the status of a range of production schedule releases, begin by opening the Change Production Schedule Release Status utility. Then you can select the old release status and the new release status in the appropriate fields. Valid status changes are:

Planned to Released

Released to Completed

Completed to Released (to make this change, the status of the production schedule must be Released)

If you want to copy the item current routing/bill of material to the production schedule item (if the PS item does not contain a routing/BOM) when you run the activity, select the “Copy to PS Item BOM” check box.

To specify the range of production schedule releases for which the status will be changed, you can select or enter appropriate data in the fields on the form. Then process the activity by:

Selecting the Preview radio button and clicking Process.

You can view the releases that will be affected by the status change in the grid on the form. You can also view the BOMs that exist for each production schedule item/release. Modify fields as necessary to narrow or expand the range of production schedule releases that will be affected.

Finally, you should select the Commit radio button and click Process to complete the activity.

Schedule ID	Item	Due Date	Old Status	New Status	Current BOM Exists	Standard BOM Exists	PS Item BOM Exists	PS Item Release BOM Exists
PS00000010	MF-50900	07/18/2012	Planned	Released	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PS00000010	MF-50900	07/25/2012	Planned	Released	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PS00000010	MF-50900	08/01/2012	Planned	Released	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PS00000010	MF-50900	08/08/2012	Planned	Released	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PS00000010	MF-50900	08/15/2012	Planned	Released	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PS00000010	MF-50900	08/22/2012	Planned	Released	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Change Production Schedule Release Status utility – grid listing releases that will be affected

Creating production schedule release BOMs

After you create a production schedule release BOM, it remains independent of the corresponding production schedule item BOM; changes you make to the release BOM are not automatically synchronized to the production schedule item BOM (and vice versa).



When you post pieces complete, the system uses the Production Schedule Release BOM, not the Production Schedule Item BOM.

Keep in mind that before the status for a production schedule release can be changed to Released, a production schedule release BOM must exist for the release.

The **PS Item Release BOM Exists** check box in the Production Schedule Releases grid will be checked if a BOM exists for the production schedule release. If this check box is cleared, you must create a release BOM before you can change the status to Released.

Production schedule release operations

If you want to create the routing operations for a production schedule release, or modify operations that were copied from the production item BOM, you can do so by clicking the Release Operations button on the Production Schedule Items form. This displays the Production Schedule Release Operations form from which you can add or modify routing operations for the production schedule item.

Production schedule release materials

If you want to add, modify, or delete materials for routing operations of a production schedule release, you can do so by clicking the Release Materials button on the Production Schedule Items form. This displays the Production Schedule Release Materials form from which you can add or modify materials for the production schedule release.





Demo: Create and update the BOMs for a production schedule's items and releases

Your instructor will demonstrate how to create and update the BOMs for the items and releases of a production schedule.





Exercise 5.2: Create and update the BOMs for a production schedule's items and releases

In this exercise, you will create and update the BOMs for the items and releases of a production schedule.

Note: Progressive Cycles has decided to change just the production schedule rather than the current routing and bill of materials. The reason they are doing this is that this is a one-time only startup change. Next time they will use the current routing and bill of material without any alterations.

Select the first release of PS item **TA-30000** and update the production schedule release BOM for this release only with the updated quantity of the material.

For PS item **TA-31000**, use the **Copy To PS Item BOM** button to copy the current BOM to the PS item BOM. It should prompt you to copy that same BOM to all of the releases. If it doesn't, use the **Copy to Release BOM** button to create the PS release BOMs.

Finally, use the **Change Production Schedule Release Status** utility to change the status for all releases of both PS items to Released.

Exercise 5.2 steps

Part 1: For PS item TA-30000, use the Copy To PS Item BOM button to copy the current BOM to the PS item BOM. It should prompt you to copy that same BOM to all of the releases.

1. Select **Master Explorer > Modules > Production > Production Schedules > Production Schedules**. The **Production Schedules (Filter In Place)** form opens.
2. Click **Filter In Place**.
3. Select **Production Schedule ID 100** from the list in the left panel.
4. Click **Items/Releases**. The **Production Schedule Items** form opens with item **TA-30000** displayed.
5. Click **Copy to PS Item BOM**. A dialog box opens with the message, "[Copy Routing/BOM] will be performed."
6. Click **OK**. A dialog box opens with the message, "[Copy Routing/BOM to PS Releases without a Route/BOM] will be performed."
7. Click **OK**.

Part 2: Update the quantity for the ZAL-200 from 2 to 3

1. Click the first row in the production schedule releases grid to select the first release.
2. Click **Release Materials**. The **Production Schedule Release Materials (Linked)** form opens.

3. Type 3 in the **Quantity** field to replace the existing value.
4. Click **Save**.
5. Close the **Production Schedule Release Materials (Linked)** form.

Part 3: For PS item TA-31000, use the Copy To PS Item BOM button to copy the current BOM to the PS item BOM.

1. Select the **TA-31000** production schedule item from the list in the left panel of the screen.
2. Click **Copy to PS Item BOM**. A dialog box opens with the message, “[Copy Routing/BOM] will be performed.”
3. Click **OK**. A dialog box opens with the message, “[Copy Routing/BOM to PS Releases without a Route/BOM] will be performed.”
4. Click **OK**.



The **PS Item BOM Exists** check boxes for all releases of both PS items should be selected, indicating that all of the necessary BOMs for the production schedule are in place.

Part 4: Use the Change Production Schedule Release Status utility to change the status for all releases of both PS items to Released.

1. Select **Master Explorer > Modules > Production > Production Schedules > Utilities > Change Production Schedule Release Status** to open the **Change Production Schedule Release Status** utility.
2. Select **Planned** from the **Old Status** drop-down list, if it is not already selected.
3. Select **Released** from the **New Status** drop-down list, if it is not already selected.
4. Clear the **Copy to PS Item BOM** check box.
5. Select **100** from the **Start Schedule ID** drop-down list.
6. Click **Process**. A dialog box opens with the message, 10 Production Schedule Release(s) were processed.”
7. Click **OK**.
The grid on the bottom of the form will display the affected releases for your review.
8. Select **Commit**.
9. Click **Process**. A dialog box opens with the message, “[Change Production Schedule Release Status] will be performed.”
10. Click **OK**. A dialog box opens with the message, “10 Production Schedule Release(s) were processed.”
11. Click **OK**.
12. Close the **Change Production Schedule Release Status** utility form.
13. Close the **Production Schedule Release Materials (Linked)** form.
24. Close the **Production Schedules** form.

Check your understanding



List the various bills of material (BOMs) that must be in place before production schedule processing can take place.





Which of the following conditions must be met for transactions to be posted against a production schedule release? Select all that apply.



- a) The status of the release must be Released
- b) .The release must be firmed into a job order.
- c) There must be a routing/BOM for the release.
- d) All of the operations in the release routing must be control points.



True or false. Changes you make to the PS item routing/BOM are automatically synchronized to the PS releases routing/BOMs.



- a) True
- b) False



Lesson 6: Production schedule processing

Estimated time

40 minutes

Learning objectives

After completing this lesson, you will be able to:

- Explain the process for replenishing floor stock locations.
- Identify the transactions that are used for production schedule processing.
- Describe the steps for recording completion of production schedule finished goods and scrap inventory.
- Identify the reports that are generated to monitor production schedule finished goods.

Topics

- Introduction
- Replenishing floor stock
 - Generating the Floor Stock Replenishment Report
- Recording the finished goods
 - Production Schedule Complete Transactions form
- Recording the production schedule scrapped inventory
 - Production Schedule Scrap Transactions form
- Monitoring production schedule finished goods
 - Cumulative Production by Item Report
 - Production Schedule Report

Introduction

Once the production schedules are created, you will need to have the following information for each cell or line to control production:

- Schedule
- Load
- Daily dispatch
- Required floor stock replenishments
- Pieces completed

The schedule, load, and dispatch can be created by APS or the Scheduler. See those training workbooks for more information. You can also use other tools described in the appendix to plan your production.

In a repetitive manufacturing environment you record pieces completed and scrapped at a work center. The costs accumulate at the work center instead of to a job. You can also post time and material independent of pieces completed. The table below shows you which transactions to use.

Using this transaction...	You can post...
Production Schedule Complete	Pieces completed at a control point operation and a move to the next location or inventory. This will trigger backflushing of material, labor, and overhead. Lot or serial tracked materials cannot be backflushed.
Production Schedule Scrap	Pieces scrapped at any operation. This will trigger backflushing of material, labor, and overhead.
Just-In-Time Production	Pieces completed at last operation and a move into inventory. This will trigger backflushing of material, labor, and overhead.
Work Center Material	Material issued to a work center. Lot and serial tracked items can be issued with this transaction.
Work Center Machine Time	Machine time which triggers application of machine overhead.
Work Center Labor	Hours worked.

In this lesson the production schedule transactions are covered, along with replenishing floor stock. The next lesson will cover the other transactions in the table above.

Replenishing floor stock

The Floor Stock Replenishment Report is a tool that advises the user of quantities needed to fill floor stock locations attached to work centers to cover existing production requirements.

This report does not issue stock. It provides consolidated quantities of items that are required to be moved to a floor stock location for pending production.

This report works only for locations with work centers attached to them (a work center is designated on the Location Codes form). The location is referred to as a floor stock location (cannot be a transit or non-nettable location).

Generating the Floor Stock Replenishment Report

Enter information and select options as needed and then click Preview to preview the output. Click Print to print the report.

Warehouse

Enter the warehouse for which you want to generate the report.

Consolidate By

To consolidate and sort the report by the From Location, you can select "From Location". This format is best for people picking materials to replenish the floor stock locations.

To consolidate and sort the report by the To Location, you should select "To Location." This format is best for people replenishing materials for the floor stock locations.

To print the report in both formats, you should select "Both."

Post Material Moves

This option on the Floor Stock Replenishment Report posts a move transaction to move inventory to the appropriate location:

Select **All** to move all available inventory.

Select **Filled Only** to move only enough material to meet all requirements for the current run.

Select **None** to move no inventory.

Net WC/Floor Location Qty Avail

To include or exclude the current quantity on hand at the work center floor stock location, you can select or clear this check box. Select this option if the quantity on the floor should be subtracted from the required quantity.

Starting and Ending WC

The starting and ending work centers to include on the report can be entered or selected.

Starting and Ending Job

The first and last job numbers you want to include on the report can be entered or selected.

Starting and Ending Schedule ID

The first and the last production schedule IDs that you want to include on the report can be entered or selected.

Starting and Ending Item


The first and last item numbers to include on the report can be entered or selected.

Starting and Ending Component Item

The first and last component item to include on the report can be entered or selected.

Starting and Ending Date

The first and last date to include on the report can be entered.

Floor Stock Replenishment Report									
7/20/2014 1:29:46 AM									
Consolidated By:									
From		To		Work Centers		Item		Quantity U/M Qty Moved	
Whse	Location	Whse	Location			Description			
MAIN	FLOOR					ZAL-200	1,190.00	FT	1,190.00
		MAIN	H-CUT	H-CUT		Aluminum,Tube,1/8",1"dia (ACT-FIFO)			
Consolidated By:									
To		From		Work Centers		Item		Quantity U/M Qty Moved	
Whse	Location	Whse	Location			Description			
MAIN	H-CUT					ZAL-200	1,190.00	FT	
		MAIN	FLOOR	H-CUT		Aluminum,Tube,1/8",1"dia (ACT-FIFO)			

Floor Stock Replenishment Report – sample output



Demo: Replenish floor stock

Your instructor will demonstrate how to determine which floor stock locations need replenishment and how materials are moved to that location.





Exercise 6.1: Replenish floor stock

In this exercise, you will determine which floor stock locations need replenishment and move materials to that location.

The location H-CUT needs to be stocked with enough materials to support next week's production.

Exercise 6.1 steps

Part 1: Process a miscellaneous receipt into the FLOOR stock location

1. Select **Master Explorer > Modules > Material > Inventory > Activities > Miscellaneous Receipt**. The **Miscellaneous Receipt** form opens.
2. Select **ZAL-200** from the **Item** drop-down list.
3. Type **5000** in **Quantity** field.
4. Select **FLOOR** from the **Location** drop-down list.
5. Select **MMR** from the **Reason** drop-down list.
6. Click **Receive**. A dialog box opens with the message, "[Miscellaneous Receipt] was successful."
7. Click **OK**.
8. Close the **Miscellaneous Receipt** form.

Part 2: View quantities needed and move the materials to the H-CUT floor stock location



Use the WC, Schedule ID, or Component Item ranges to limit the report to the cell we are using in this course.

1. Select **Master Explorer > Modules > Production > Work Centers > Reports > Floor Stock Replenishment Report** to open the **Floor Stock Replenishment Report** form.
2. Select **MAIN** from the **Warehouse** drop-down list.
3. Select **Both** from the **Consolidated By** drop-down list.
4. Select **H-CUT** from the **Starting WC** drop-down list.
5. Select **100** from the **Schedule ID** drop-down list.
6. Click **Preview**.
7. View the report in the **Report Viewer** and view the amount of the ZAL-200 needed (1,190 ft.)
8. Close the **Report Viewer** form.
9. Select **Filled Only** from the **Post Material Moves** drop-down list.
10. Click **Print**. A dialog box opens with the message, "[Post Material Moves] will be performed."
11. Click **OK**. A dialog box opens with the message, "Report Submitted"
12. Click **OK**.
13. Close the **Floor Stock Replenishment Report** form.

Recording the finished goods

Use the Production Schedule Complete Transactions form to record the finished goods (pieces complete), and the Production Schedule Scrap Transactions form to record scrapped material.

Processing production schedule complete transactions backflushes all labor, material, and machine time marked as backflush on the operations in the current routing bill of material. If you have lot-tracked or serial-tracked items that cannot be backflushed, you will need to enter work center material transactions for these items. Any differences between the standard routing and the current routing bill of material will be stored in the accumulated amounts tab of the work center and will create variances when running end of period costing.

A production schedule release can only be consumed or have the completed/scrapped quantities applied against it, up to the released quantity, unless that production schedule release is the last production schedule release that falls within the current PS Look Ahead/Behind window. In that case, the remaining quantities will be posted against the last production schedule release, and the completed/scrapped quantity will exceed the released quantity.

Production Schedule Complete Transactions form

Use the Production Schedule Complete Transactions form to record transactions for finished goods.

To record the transaction, the appropriate data needs to be entered in the required fields. The following is a snapshot of the different fields on the form.

Item – The item ID of the finished production item is typed or selected in this field.

Completed – The user types the completed quantity, excluding scrap, in the item's base unit of measure.

Transaction Date – A date is entered for the transaction or the default date can be accepted.

Schedule ID – The production schedule ID from which the item was produced can be entered in this field.

Work Center – The work center corresponding to the operation for which completion is being recorded can be entered in this field.

Operation – The operation of the production schedule release for which completion is being recorded should be selected in this field. Only operations designated as control points can be selected.

Employee – The employee number of the person reporting the completed quantities can be entered in this field.

Shift – The shift ID of the shift when completion of the item was reported can be entered in this field.

Location – A valid item location where finished goods will be moved to inventory can be entered in the field. If the operation is the last on the routing, then the default value is the first ranked item location.

Lot - The lot number displays for items that are lot tracked and will default to the next valid lot number based on the item's lot prefix.

When finished entering data, clicking **Process** will complete the transaction.



Production schedule complete transactions apply only to operations designated as control points.

Posting process

When a control point operation is posted, the system:

Processes each operation controlled by the control point in turn, starting with the lowest operation number.

Backflushes materials on the BOM for all operations controlled by the control point where the material has been set up to be backflushed.

Backflushes labor and/or machine hours for all control points for operations where the Backflush field is set to Labor, Machine, or Both.

Absorbs/backflushes overhead for all operations controlled by the control point based on the setting for overhead basis in the work center.

Moves quantities to the next operation or to inventory (if it is the last operation), for all operations tied to the control point.

Posts or receives into inventory all quantities (received, complete, scrapped and moved), when appropriate.

Applies scrap factors to the material issues.

Backflushing examples

Backflushing example #1				
Operation	Quantity	Control Point Complete?	Complete?	Complete?
10	5	No	Yes	
20	5	No	Yes	
30	5	Yes	Yes	
40	0	No	No	
50	0	Yes	No	

Backflushing Example #1 illustrates backflushing as it works for production schedules. Operation 30 is designated as a control point. If you enter a transaction and post it for quantity complete of 5, then the system will assume that a quantity of 5 was also completed for operations 10 and 20. (This also assumes that this is the only transaction that has been posted against this job.)

For production schedules, if you complete the operation which serves as a control point, the prior operations tied to the control point will be completed. From the example above, if you posted a complete transaction for operation 30, as indicated, operations 10 and 20 will have records created as a result that would complete them.

The system does not assume that all operations or control points must have transactions entered and posted for them. The system does not require or validate that previous operations or control points have been posted. Using the same example, you can post operation 50 with a quantity complete of 5 and Complete, "Yes," without having posted operation 30, or any other previous operation.

Recording the production schedule scrapped inventory

Scrapped inventory must be recorded for production schedule releases. You can report scrapped quantities for any operation in a production schedule; the operation does not have to be a control point.

So you can select any operation, a reason code, and employee and a shift to record a production schedule scrap transaction.

Production schedule scrap transactions trigger backflushing of material, labor, and overhead just as the production schedule complete transactions did.

Production Schedule Scrap Transactions form

Use the Production Schedule Scrap Transactions form to record transactions for finished goods.

To record the transaction, the appropriate data needs to be entered in the required fields. The following is a snapshot of the different fields on the form.

Item – The item ID of the material being scrapped is typed or selected in this field.

Scrapped – The user types the quantity of the material that is being scrapped in this field.

Schedule ID – The production schedule ID from which the item was produced can be entered in this field.

Reason – The reason code corresponding to the reason the material is being scrapped must be entered in this field.

Employee – The employee number of the person reporting the scrapped quantities can be entered in this field.

Work Center – The work center corresponding to the operation for which scrap is being recorded can be entered in this field.

Operation – Any operation of the production schedule release for which completion is being recorded should be selected in this field.

Transaction Date – A date is entered for the transaction or the default date can be accepted.

Shift – The shift ID of the shift when the scrap was reported can be entered in this field.

When finished entering data, clicking **Process** will complete the scrap transaction.



You can execute production schedule scrap transactions from any operation and does not require that you have previously reported completed quantities.


Monitoring production schedule finished goods

You can view finished production by item or by schedule using the “Cumulative Production by Item Report” and the “Production Schedule Report.”

Cumulative Production by Item Report

The Cumulative Production by Item Report lists all quantities and cumulative quantities for a selected range of items, schedule IDs and dates. The report is sorted by item. Use this report to determine the production status of an item.

This report shows the released, completed, and scrapped quantities of each item. It also includes cumulative released, completed, and scrapped quantities. You can specify the bin size to display; for example, weekly or monthly.

Cumulative Production by Item Report							
10/24/2013 3:00:50 PM							
Item:	MB-11000	Bicycle,Model-200,Mountain,Silver			U/M: EA		
		7/16/2012	7/17/2012	7/18/2012	7/19/2012	7/20/2012	7/21/2012
Released		20.00	0.00	20.00	0.00	20.00	0.00
Completed		0.00	0.00	0.00	0.00	0.00	0.00
Scrapped		0.00	0.00	0.00	0.00	0.00	0.00
Cumulative Released		20.00	20.00	40.00	40.00	60.00	60.00
Cumulative Completed		0.00	0.00	0.00	0.00	0.00	0.00
Cumulative Scrapped		0.00	0.00	0.00	0.00	0.00	0.00
		7/22/2012	7/23/2012	7/24/2012	7/25/2012	7/26/2012	
Released		0.00	0.00	20.00	0.00	20.00	0.00
Completed		0.00	0.00	0.00	0.00	0.00	0.00
Scrapped		0.00	0.00	0.00	0.00	0.00	0.00
Cumulative Released		60.00	60.00	80.00	80.00	100.00	0.00
Cumulative Completed		0.00	0.00	0.00	0.00	0.00	0.00
Cumulative Scrapped		0.00	0.00	0.00	0.00	0.00	0.00

Cumulative Production by Item Report – sample output





Exercise 6.2: Record production schedule completed items and scrap

In this exercise, you will record production schedule completed items and scrap materials.

Exercise instructions

Let's assume that production has started on the two handlebar items, TA-30000 and TA-31000, under production schedule ID 100 and that the first day of production on Monday has completed. Production transactions need to be recorded for the first release of both items.

The following production forms were completed by the supervisor of the handle bar cell on Monday.

Handlebar cutting work center (H-CUT)

Part	Completed	Scrapped	Reason	Location
TA-30000	52	3	Drop off	---
TA-31000	28	2	Mfg. Process	---

Handle Bar Finishing Work Center

Part	Completed	Scrapped	Reason	Location
TA-30000	51	1	Matl. Quantity	INS-1
TA-31000	27	1	Drop off	INS-1

Also, take a look at the location on-hand quantity for the aluminum tubing, item ZAL-200, using the Item Stockroom Locations form for stock location H-CUT. It should be 255 feet less than before the recorded production, indicating that backflushing was performed.

Exercise 6.1 steps

Part 1: Complete the production schedule transactions for TA-30000 for the completed items

1. Select **Master Explorer > Modules > Production > Production Schedules > Activities > Production Schedule Complete Transactions**. The **Production Schedule Complete Transactions** form opens.
2. Select **TA-30000** from the **Item** drop-down list.
3. Type **52** in the **Completed** field.

4. Type *[the next scheduled due date]* in the **Transaction Date** field.
5. Type *100* in the **Schedule ID** field.
6. Select **H-CUT** from the **Work Center** drop-down list.
7. Select **10** from the **Operation** drop-down list, if it is not already selected.
8. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
9. Click **OK**.
10. Select **TA-30000** from the **Item** drop-down list.
11. Type *51* in the **Completed** field.
12. Type *[the next scheduled due date]* in the **Transaction Date** field.
13. Type *100* in the **Schedule ID** field.
14. Select **H-FIN** from the **Work Center** drop-down list.
15. Select **30** from the **Operation** drop-down list, if it is not already selected.
16. Select **INS-1** from the **Location** drop-down list.
17. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
18. Click **OK**.

Part 2: Complete the production schedule transactions for TA-31000 for the completed items

1. Select **TA-31000** from the **Item** drop-down list.
2. Type *28* in the **Completed** field.
3. Type *[the next scheduled due date]* in the **Transaction Date** field.
4. Type *100* in the **Schedule ID** field.
5. Select **H-CUT** from the **Work Center** drop-down list.
6. Select **10** from the **Operation** drop-down list, if it is not already selected.
7. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
8. Click **OK**.
9. Select **TA-31000** from the **Item** drop-down list.
10. Type *27* in the **Completed** field.
11. Type *[the next scheduled due date]* in the **Transaction Date** field.
12. Type *100* in the **Schedule ID** field.
13. Select **H-FIN** from the **Work Center** drop-down list.
14. Select **30** from the **Operation** drop-down list, if it is not already selected.
15. Select **INS-1** from the **Location** drop-down list.
16. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
17. Click **OK**.
18. Close the **Production Schedule Complete Transactions** form.

Part 3: Perform a Production Schedule Scrap transaction

1. Select **Master Explorer > Modules > Production > Production Schedules > Activities > Production Schedule Scrap Transactions**. The **Production Schedule Scrap Transactions** form opens.
2. Select **TA-30000** from the **Item** drop-down list.
3. Type **1** in the **Scrapped** field.
4. Type **100** in the **Schedule ID** field.
5. Select **LDD** from the **Reason** drop-down list.
6. Type **1** in the **Employee** field.
7. Select **H-CUT** from the **Work Center** drop-down list.
8. Select **10** from the **Operation** drop-down list, if it is not already selected.
9. Type *[the next scheduled due date]* in the **Transaction Date** field.
10. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
11. Click **OK**.
12. Select **TA-31000** from the **Item** drop-down list.
13. Type **2** in the **Scrapped** field.
14. Type **100** in the **Schedule ID** field.
15. Select **IMP** from the **Reason** drop-down list.
16. Type **1** in the **Employee** field.
17. Select **H-CUT** from the **Work Center** drop-down list.
18. Select **10** from the **Operation** drop-down list, if it is not already selected.
19. Type *[the next scheduled due date]* in the **Transaction Date** field.
20. Type **1** in the **Shift** field.
21. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
22. Click **OK**.
23. Close the **Production Schedule Scrap Transactions** form.

Part 4: Verify the completed and the scrapped quantities

1. Select **Master Explorer > Modules > Production > Production Schedules > Productions Schedules**. The **Production Schedules (Filter In Place)** form opens.
2. Click **Filter In Place**.
3. Select **Production Schedule ID 100** from the list in the left panel.
4. Click **Items/Releases**.
5. The **Production Schedule Items (Linked)** form opens with item **TA-30000** displayed.
6. Verify the **Completed** and the **Scrapped** quantities in the grid for the first release.
7. Select item **TA-31000** from the listing in the left panel of the screen.
8. Verify the **Completed** and the **Scrapped** quantities in the grid for the first release.

9. Close the **Production Schedule Items (Linked)** form.
10. Close the **Production Schedules** form.

Part 5: Verify the quantity on hand in the H-CUT location

1. Select **Master Explorer > Modules > Material > Inventory > Item Stockroom Locations**. The **Item Stockroom Locations (Filter In Place)** form opens.
2. Type *H-CUT* in the **Location** field.
3. Click **Filter In Place** on the toolbar to filter for the **H-CUT** location.
4. Verify the quantity in the **Location On Hand** field is 255 feet less than previous quantity (1190, 935).
5. Close the **Item Stockroom Locations** form.



Check your understanding



Describe the maximum number of completed production items that can be recorded for a production schedule release and what happens when that maximum number is exceeded.





True or false. Production schedule scrap materials can only be recorded for a control point operation.



- a) True
- b) False



Lesson 7: Other transactions

Estimated time

40 minutes

Learning objectives

After completing this lesson, you will be able to:

- Determine when work center transactions should be used.
- Explain how just-in-time transactions are recorded.
- Explain how work center transactions are recorded.

Topics

- Introduction
- Posting just-in-time (JIT) production transactions
- Posting work center transactions
 - Work center labor transactions
 - Work center machine time transactions
 - Work center material transactions
- End-of-period costing

Introduction

With repetitive manufacturing most labor, material, and machine time transactions will be backflushed. However, sometimes backflushing is not convenient or even possible. For example, you cannot backflush lot or serial number tracked items. Or perhaps you needed additional labor or material to complete production for a few releases.

While it is desirable to use the system to control repetitive manufacturing production through production scheduling, some production methods, such as KANBAN, only report finished goods being moved into inventory. In those cases, just-in-time (JIT) production transactions are used, instead of production schedule transactions, to record the move to inventory and the costs.

In this lesson, you will learn about these other production transactions:

- Just-in-time (JIT) production
- Work center labor
- Work center machine hours
- Work center material

The lesson will finish up describing the use of the end-of-period costing activity to reconcile production costs at the work center level.



Posting just-in-time (JIT) production transactions

Just-in-time production transactions allow for the recording of transactions for items that are not tied to specific job orders or production schedules. You do not record any processes along the routing – only when the item is completely finished. Items being produced from just-in-time transactions must be standard costed.

All backflushing will be done from the current routing. Just-in-time production transactions, job, and production schedules can be used simultaneously in the system.

Just-in-time (JIT) production is typically used for the production of items that have a standard cost and that you want to be able to produce on demand. It is based on the idea of producing items that are not tied to specific job orders or production schedules, and transactions are only recorded when the item is actually finished. Use the Just-In-Time Production Transactions form to enter such items into inventory.

To enter JIT production items into inventory

Use the Just-In-Time Production Transactions form to record transactions for finished goods.

To record the transaction, the appropriate data needs to be entered on the form. The following is a snapshot of the different fields on the form.

Item – The item ID of the finished production item is typed or selected in this field.

Completed – The user types the completed quantity, excluding scrap, in the item's base unit of measure.

Note: This value cannot be zero. To enter items into inventory, use positive values. To remove items from inventory, use negative values.

Warehouse – The warehouse where the finished goods are to be stored is entered here.

Note: If you try to select a warehouse with which the item does not already have an association, the system prompts you to create the association before you can select the warehouse. To create an item/warehouse association, use the Item/Warehouse form.

Location – The location within the selected warehouse where you want the items stored is entered in this field.

Note: If you try to enter a location for which the warehouse does not have an association with the item, the system prompts you to let you know that it will automatically create the association. Click **OK**.

Lot - The lot number displays for items that are lot tracked and will default to the next valid lot number based on the item's lot prefix. You may select the default number or enter a different number.

Note: If you try to enter a lot identifier that does not currently exist, the system prompts you, to let you know that it will automatically create the lot.

Shift and Employee – optionally enter the shift in which the transaction is being performed and the employee performing it.

If the item is a serial-tracked item, use the Serial Numbers tab fields to generate the serial numbers.

When finished entering data, clicking Process will complete the transaction.

Posting work center transactions

With repetitive manufacturing most labor, material, and machine time transactions will be backflushed. However, there are times when you need to issue additional labor or machine time, or material transactions directly to the work center.

Work center labor, material, and machine time transactions are accumulated in the WIP bucket on the Accumulated Amounts tab of the work center.

Work center labor transactions

The Work Center Labor Transactions form is used to record labor directly to a work center, independent of an item or a production schedule. Appropriate data should be entered in the required fields:

Work Center – The work center for which a labor transaction is being recorded is entered in this field.

Employee – The employee number of the person whose labor is being recorded should be entered here.

Start Time and **End Time** – The starting and ending times of the labor being recorded are optionally entered in these fields.

Total Hours – The total labor hours being recorded for this transaction should be entered in this field.

Shift – The shift ID of the shift when the labor being recorded was performed is entered in this field.

Transaction Date – A date for the transaction is entered in this field, or accept the default of the current date.

When finished, clicking **Process** will complete the transaction.

Work center machine time transactions

The Work Center Machine Time Transactions form is used to record machine time directly to a work center, independent of an item or a production schedule. Appropriate data should be entered in the required fields:

Work Center – The work center for which a machine time transaction is being recorded is entered in this field.

Total Hours – The total machine hours being recorded for this transaction should be entered in this field.

Start Time and **End Time** – The starting and ending times of the machine time being recorded are optionally entered in these fields.

Shift – The shift ID of the shift when the machine time being recorded was utilized is entered in this field..

Transaction Date – A date for the transaction is entered in this field, or accept the default of the current date.

Employee – The employee number of the person who reported the machine usage can be entered in this field.

When finished, clicking **Process** will complete the transaction.

Work center material transactions

The Work Center Material Transactions form is used to issue materials directly to a work center. If a production schedule or JIT item requires lot or serial tracked materials which cannot be backflushed, those materials must be issued using the Work Center Material Transactions form.

Appropriate data should be entered in the required fields:

WC – The work center to which the material will be issued should be entered in this field.

Item – The item ID of the material being issued must be entered in this field.

By Container and **Container** – The By Container check box can be selected and a container ID entered, if issuing by a container.

Quantity – The quantity and unit of measure of the item being issued is entered in this field.

Location – The warehouse location from which the material will be issued is entered in this field.

Lot - The lot number from which the material will be issued can be entered in this field.

Transaction Date – A date for the transaction must be entered in this field or accept the default of the current date.

Employee – The employee number of a person associated with the material issue can be entered in this field, if desired.

Account – The G/L account number to be credited is entered in this field. This is only required for items for which there are no item records in the system.

Cost fields – The various costs of the non-inventory item being issued can be entered in these fields. This is only required for items for which there are no item records in the system.

When finished, clicking **Process** will complete the transaction.

Note: Use the **Serial Numbers** tab when you issue a serial-tracked item.

Posting process

During entry and posting of work center transactions:

The system posts manual transactions when you enter them; there is no batch processing. In contrast, you must perform an additional step to post unposted job transactions after entering them.

The system adds WIP costs to their respective WIP buckets on the Work Centers form, Accum Amt tab, when you enter the transaction.

Each work center has associated WIP costs. When you move finished goods into inventory, the system computes the earned costs from each work center on the routing.

When backflushing, JIT production ignores control points. The system processes all operations, and backflushing occurs where appropriate.

When you enter transactions, variance accounts are not immediately updated. The system does not record variances until you run the End of Period Costing activity.



Demo: Record JIT production and work center transactions

Your instructor will demonstrate how to create some work center transactions.





Exercise 7.1: Record JIT production and work center transactions

In this exercise, you will create some work center transactions

Exercise instructions

On Monday, the handlebar cutting work center had to stop production for 2 hours when the cutting machine broke down and maintenance had to be called in to fix it.

Progressive Cycles wants to capture the cost of the maintenance worker plus the idle time associated with the other crew members while they waited for the machine to be fixed.

Record the following hours at the H-CUT work center:

Employee	Hours
Michael Epstein	2 hours (Maintenance Worker)
Robert Penrod	2 hours
Jeff Smith	2 hours
Thomas Zimmerman	2 hours

Exercise 7.1 steps

1. Select **Master Explorer > Modules > Production > Work Centers > Activities > Work Center Labor Transactions**. The **Work Center Labor Transactions** form opens.
2. Select **H-CUT** from the **Work Center** drop-down list.
3. Select **12** from the **Employee** drop-down list.
4. Type **2** in the **Total Hours** field.
5. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
6. Click **OK**.
7. Select **H-CUT** from the **Work Center** drop-down list, if it is not already selected.
8. Select **10** from the **Employee** drop-down list.
9. Type **2** in the **Total Hours** field.

10. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
11. Click **OK**.
12. Select **H-CUT** from the **Work Center** drop-down list, if it is not already selected.
13. Select **11** from the **Employee** drop-down list.
14. Type 2 in the **Total Hours** field.
15. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
16. Click **OK**.
17. Select **H-CUT** from the **Work Center** drop-down list, if it is not already selected.
18. Select **7** from the **Employee** drop-down list.
19. Type 2 in the **Total Hours** field.
20. Click **Process**. A dialog box opens with the message, “[Post] was successful.”
21. Click **OK**.
22. Close the **Work Center Labor Transactions** form.



End-of-period costing

Labor, materials, and machine hours per work center are accumulated on the Work Center form - Accum Amt tab (accumulated amounts) when you post just-in-time transactions, complete quantities per production schedule, or work center transactions for labor, machines, and materials.

Backflushing uses the production schedule routing to calculate materials and hours. If you report production through a JIT transaction, backflushing uses the current routing for the item.

End of Period Costing activity

After you have done all of the processing for your repetitive transactions for a specific period of time, end-of-period costing needs to be ran. The time period for which to run the end of period costing activity is user-defined. It can be daily, weekly, or monthly.

Starting Work Center – The first work center of a range of work centers to include in this process is entered in this field.

Ending Work Center – The last work center of a range of work centers to include in this process is entered in this field.

Post Through – The most recent date of the transactions you want to include in this process should be entered in this field or you can accept the default of the current date.

Transaction Date – The date you want assigned to transactions as a result of running the End of Period Costing activity is entered in this field or you can accept the default of the current date.

When finished, clicking **Process** will complete the activity.

This activity reconciles the differences between the work centers' earned costs (all goods a work center produced during the period, the volume of materials and hours that should have passed through the work center, and the costs of that volume) and actual costs (the actual volume of materials and hours spent on the work center, and the costs of that volume).

From this reconciliation, the system determines the cost variances and posts them to their respective variance accounts.

Cost performance measurements emphasize production costs for the work center, but do not provide detailed measurements for particular production schedules, JIT transactions, or their routings and end items.

Caution: While this process runs, you can enter transactions for production and backflush WIP-related costs to the work centers. If transaction dates for these postings fall before or during the Post Through date, the End of Period Costing activity may catch some of the WIP costs for those transactions, but not all of the WIP (depending on the timing). Also, actual values may not balance with earned values, causing variances to be larger than expected. If you run the End of Period Costing activity for the same period or the next period, all timing variances will wash out.

Check your understanding



For repetitive manufacturing, list the four transactions that can be posted directly to a work center, independent of the production schedule transactions.





Which routing is used for backflushing of materials and time for production reported through just-in-time production transactions?



- a) Current routing
- b) Job routing
- c) Production schedule routing
- d) Standard routing



True or false. When work center transactions are processed, the variance accounts are updated for each transaction at the time they are processed.



- a) True
- b) False



Course summary

Estimated time

30 minutes

Course objectives

Now that you have completed this course, you should be able to:

- Describe how to set up the parameters required for repetitive manufacturing.
- Discuss how to maintain the work center records.
- Describe how to set up the criteria required for production items and component materials for repetitive manufacturing.
- Describe how to copy and manipulate routings and bills of material.
- Explain how to generate production schedules.
- Describe how to update production schedules.
- Explain how to manage the supply of floor stock locations.
- Describe how to record production schedule transactions.
- Describe how to record just-in-time production and work center transactions.

Topics

- Course review

Course review



Repetitive manufacturing production control is supported by which module?



- a) Projects
- b) Production schedules
- c) Job orders
- d) Inventory management



Where are repetitive manufacturing production costs accumulated?



- a) Production item record
- b) Job operations
- c) Floor stock location
- d) Work center



Which costing method is used for repetitive manufacturing?



- a) Actual
- b) Average
- c) Weighted average
- d) Standard



Why is it important that the WIP, variance, and overhead account numbers be set up for work centers under repetitive manufacturing?



- a) Production costing is done at the work center level
- b) Those accounts can only be used for work centers.
- c) The account number fields are required fields.
- d) None of the above.



What backflush options are available on the Work Centers form? Select all that apply.



- a) Labor
- b) Machine
- c) Both
- d) Neither
- e) Material



Where is a floor stock location set up?



- a) Items form
- b) Item Stockroom Locations form
- c) Locations form
- d) Work Centers form



Which of the following terms completes this sentence? A floor stock location must be associated to _____ for floor stock replenishment to work.



- a) a production schedule
- b) a bill of material
- c) a job order
- d) a work center



Place the four levels of backflush locations below into the proper order in which the system will check them to find a location to use when backflushing materials. Place a number (1 – 4) to the left of each level to indicate the sequence in which they are checked for a valid backflush location.



- ___ Item location that references the operation's work center
- ___ Control tab of the Items form
- ___ Inventory parameters form
- ___ Materials form



Which of the following are used to manage the number of operations backflushed by a single transaction?



- a) Control points
- b) Inventory parameters
- c) Shop control parameters
- d) Work center resources



A routing control point is specified on which form?



- a) Items form
- b) Operations form
- c) Work Centers form
- d) Both the Operations and Work Centers forms



Which parameter on the Inventory Parameters form must be selected in order for backflushing to be used?



- a) Low-Level On Line
- b) Inventory LCL%
- c) On-Hand Neg Flag
- d) Issue by Location



Which of the following location types cannot be used for a backflush location? Select all that apply.



- a) Floor stock location
- b) Item Stockroom location
- c) Non-nettable location
- d) Transit location



The value of which field on the Current Operations form determines whether the Pieces per Labor Hour or Pieces per Machine Hour field is used?



- a) Yield
- b) Use Offset
- c) Run Duration
- d) Sched Driver



Which of the following terms completes this sentence? On the Current Operations form, the _____ field displays the processing time (adjusted for efficiency) for the operation.



- a) Yield
- b) Pieces per Machine Hour
- c) Run Duration
- d) Sched Driver



Which of the following terms completes this sentence? The Pieces per Hour fields on the Operations form refers to the number of pieces produced per _____.



- a) Resource hour
- b) Hour
- c) Labor Hour
- d) Hour average



Which of the following utilities are used to create a standard bill of material (BOM)? Select all that apply.



- a) Current BOM Cost Roll Up
- b) Roll Current Cost to Standard Cost
- c) Copy Routing BOM
- d) Current Bill of Material Processor
- e) Job and PS Bill of Material Processor



A standard BOM can be created in the same manner as a current BOM.



- a) True
- b) False



Place the activities below in the proper order for creating and using a production schedule. Place a number (1 – 5) to the left of each activity to indicate the sequence in which they should be performed.



- ___ Enter production schedule items.
- ___ Enter production schedule routings and BOMs.
- ___ Create a production schedule header.
- ___ Enter production schedule transactions.
- ___ Enter production schedule releases.



Changes made to production schedule release routing/BOMs are **not** synchronized to the corresponding production schedule item routing/BOM and vice versa.



- a) True
- b) False



Which form is used to determine the quantities of materials needed at a floor stock location pending production, and can be used to post a move transaction to the floor stock location?



- a) Miscellaneous Issue form
- b) Material Transactions form
- c) Quantity Move form
- d) Floor Stock Replenishment Report form



Which of the following forms are used to record production schedule transactions? Select all that apply.



- a) Production Schedule Complete Transactions
- b) Post Job Transactions
- c) Job and PS Bill of Material Processor
- d) Production Schedule Scrap Transactions



Which of the following statements completes this sentence? If you record quantities complete for a production schedule item at a control point operation, _____ will also have those quantities recorded as complete.



- a) all other control points in the same routing
- b) prior operations in the routing tied to that control point
- c) all operations in the routing
- d) no other operations



Production schedule complete quantities and scrap quantities must both be recorded only for operations that are designated control points.



- a) True
- b) False



Which report shows the released, completed, and scrapped quantities of production schedule items by release, and also shows cumulative totals of those quantities?



- a) Work Center Transactions Report
- b) Production Schedule Transaction Report
- c) Cumulative Production By Item Report
- d) Production Schedule Report



During production of an item under a production schedule release, each member of the crew worked two additional hours on one day to get caught up with production requirements. Where should the additional labor hours be recorded?



- a) Each crew member's employee time sheet with the production schedule ID recorded for the overtime entry
- b) Production schedule item release routing operation by increasing the resource group quantity for that operation
- c) Work Center Labor Transactions form for the work center associated to the routing operation where the labor was used
- d) Production Schedule Complete Transactions form when recording items complete for the routing operation where the labor was used



What kind of transaction is used to record production only when the production item is finished and ready to move into inventory?



- a) Production schedule complete transaction
- b) Just-in-time production transaction
- c) Job order transaction
- d) Work center material transaction



What are the types of work center transactions that can be posted to a work center when production schedule transactions cannot be used? Select all that apply.



- a) Scrap
- b) Labor
- c) Machine Time
- d) Material



If a component material for a production schedule item is serial number tracked, how is that material issued to the production line?



- a) Directly to the work center using the Work Center Material Transactions form
- b) Through backflushing when completed production items are recorded.
- c) Directly to finished good using the Just In Time Production Transactions form
- d) Through material adjustments after the finished good are moved to inventory.



Appendix A: Review scenario

Instructions



Scenario: Set up repetitive manufacturing of a new production item to be controlled using a production schedule

In this scenario, you will practice performing the setup of a new item to be produced using repetitive manufacturing processes. You will then release production schedule lines and enter production schedule transactions for completed and scrapped quantities.

This scenario does not include detailed steps so that you have the opportunity to apply the knowledge and skills you have learned in this course and in related courses. You are encouraged to experiment in this scenario as a means to better understand system behavior. Here is the information you will need to complete these tasks.

Progressive Cycle's marketing department has been conducting several surveys regarding the performance of both upright and racing handlebars. The results, thus far, have been good. The upright handle bar meets the needs successfully of those customers who enjoy leisurely riding. The racing handle bar is successful with those riders who enjoy a leisurely ride as well as an occasional race. However, the marketing area has discovered that the racing handle bar is not meeting the needs of the cyclist who is strictly looking for high performance in racing competitions. Although this is a small market segment, marketing has decided that Progressive Cycles needs to satisfy these customers in order to stay competitive.

Manufacturing and Engineering have been working diligently and have developed a new product to satisfy this new market segment. The new handle bar will be the TA-32000, High Performance Racing Handle Bar, and will be manufactured using production schedules. This new handle bar will consist of a new lighter weight aluminum material, the ZAL-250.

1. Create items

Enter the two new items in the Items with the following information:

Item	Description	Stocked	Type	Source	U/M	Product/Code
TA-32000	Handle-Bar, High Performance	No	Material	Manufactured	EA	FG-200
ZAL-250	Aluminum, tube, 1/16", 3/4" dia	Yes	Material	Purchased	FT	PP

Go to the Items form - Controls tab for the ZAL-250 and select the Backflush check box and enter H-CUT as the backflush location.

Remember, in order to produce the TA-32000 with repetitive manufacturing it must have a cost type of standard. Make sure the Cost Type field for the TA-32000 is "Standard" on the Items form - General tab.

We are not concerned with all of the other fields on the Items form – General tab (for this scenario) for our initial start-up of our new high performance handle bar.

After studying the new handle bar design, manufacturing has decided that the new high performance handle bar can be produced in the same cell as the TA-30000 and TA-31000, the "Handle Cell."

Go to the Items form - Planning tab and update the TA-32000's rate per day to 20.

2. Create current BOM

Because the TA-32000's process is almost identical to the TA-30000 and TA-31000, we can use the Copy Routing/BOM activity to create our routing. Update the Copy Routing/BOM form with the following information:

Copy From	Current
Item	TA-31000
Labor, Material, or Both	Labor

Copy To	Current
Item	TA-32000

By selecting Labor, for the Labor, Material, or Both field, we will only be copying TA-31000's routing and not the Bill of Material.

Don't forget to process the activity!

Go to Operation 20 for the TA-32000 and add the following text as a note:

"Please adhere to the specifications on Engineering's drawing for the TA-32000 so that this new aerodynamic design will be achieved."

Now that the routing is complete we must add our new material, the ZAL-250, to Operation 10 of the TA-32000's routing. The quantity will be 2ft. This material will be backflushed from our H-Cut location.

3. Create standard BOM

The final phase of setup will be to create our standard routing. Use the Roll Current to Standard Utility to create our new standard routing. The TA-32000 should be entered as the starting and ending item and the Post Change check box should be selected.

For this exercise, we are not concerned with the costing aspects of repetitive manufacturing. However, this utility must be run before any repetitive transactions can occur for the TA-32000.

4. Create production schedule

Now that everything is in place we can create a production schedule so that we can begin producing our new high performance handle bar.

Production will begin one week from this coming Monday. Use the following chart to fill in that week's appropriate dates:

Monday	/	/
Tuesday	/	/
Wednesday	/	/
Thursday	/	/
Friday	/	/

Using the generate production schedule activity, create production schedule releases backward from next Friday for the TA-32000. Create one release each day for a total quantity of 100 units. The Rate/Day

should be 20 and the status should be Released so that the production schedule routing and bill of material will be created. The Schedule ID should be "200."

Don't forget to process the activity!

Review the production schedule and the production schedule routing/BOM.

Review the production of the TA-32000 on the Cell Production form for the Handle Cell. Make sure the appropriate dates are entered.

5. Run floor stock replenishment

To prepare for the production of the TA-32000, run the Floor Stock Replenishment Report for the Handle Cell. Enter item ZAL-250 as the Starting and Ending Item. Once the requirements are known, process a miscellaneous receipt for the correct quantity into the H-Cut location.

Normally a purchase order would be required to obtain the ZAL-250.

The Floor Stock Replenishment Report should show total requirements of 200ft for the ZAL-250.

It is now Monday, the first day of production for the TA-32000. View the Cell Dispatch form for the Handle cell with Monday's date.

Post transactions

The following production tickets were written by the Handle supervisor regarding the production of the TA-32000.

HANDLE BAR CUTTING WORK CENTER

Part	Completed	Scrapped	Reason	Locations
TA-32000	18	2	Mfg. Process	---

HANDLE BAR FINISHING WORK CENTER

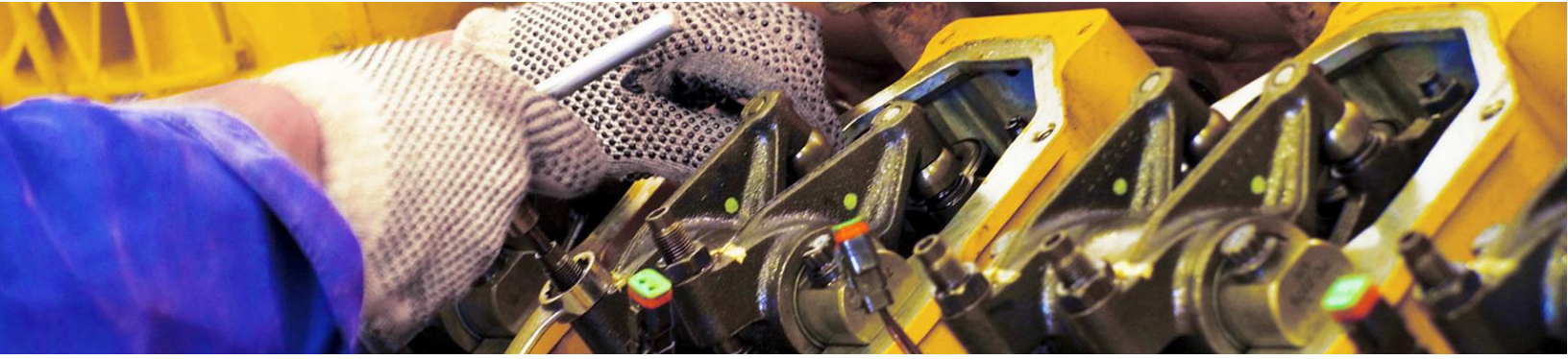
Part	Completed	Scrapped	Reason	Locations
TA-32000	18	---	---	Stock

Enter and post the above transactions.

Monitor production

Review the Production Schedules form to view the reported quantities.

Run the Production Schedule Operation Status report and the Cumulative Production by Item report to review the above transactions.



Appendix B: Reports and utilities

Reports

Cumulative Production by Item Report

This report displays released, completed and scrapped quantities by item as well as cumulative quantities for the same time period. A bin size can be selected to display the output in daily, weekly or monthly increments.

Material Use Up Report

This report helps to determine the best date to change a part in a bill of material. In many cases, you might want to use up the current inventory of a part before you replace it with a new part. With this report, you can either calculate when the quantity will reach zero, or calculate the remaining quantity at a selected break date.

Once the report is run, the following fields are populated and buttons enabled:

- On the Current Materials form: **Est Break Date** and **Date of Last Rpt** fields, and a **Matl Use Up Report** button
- On the Items form: fields on the **Matl Use Up** tab
- On the Engineering Change Notice Items form: **Est Break Date**, **Date of Last Rpt**, **Matl Req Date**, **Change Type**, and **Notify Customers** fields

Production Schedule Earned Cost Report

The Production Schedule Earned Cost Report displays the accumulated costs from production schedule complete transactions where you have moved items into inventory. The report includes information on Labor Analysis, Material Analysis and Production Cost Analysis.

Production Schedule Operation Status Report

This report displays the status of all operations for all production schedule releases. Released, Completed, and Scrapped quantities are shown for each operation.

Production Schedule Report

This report provides a listing of production schedule releases, their status, the date they are to be manufactured and the released, completed, scrapped and remaining quantities.

Production Schedule Routing Report

This report displays the routing and bills of material for a production schedule and item combination.

Production Schedule Scrapped Report

This report provides summary information to assist in tracking scrapped quantities that have been reported against production schedule operations.

Production Schedule Transaction Report

The Production Schedule Transaction Report displays the scrap that has been reported from production schedule scrapped transactions. It provides summary information to assist in tracking the status of

production schedules and identifies completed quantities that have been reported against production schedule operations.

Material Transactions Report

The Material Transactions Report provides summary information to assist in tracking the quantity and location of items that have been reported through JIT and production schedule transactions.

Utilities

Change Production Schedule Release Status

This utility allows the user to perform multiple changes to the status of production schedule releases. Valid status changes are:

- Planned to Released
- Released to Completed
- Completed to Released (to make this change, the status of the production schedule must be Released)

Delete Production Schedule Releases

This utility deletes a specified range of releases within a production schedule. Releases must have a status of Planned or Complete for this utility to delete them.

Job and PS Bill of Material Processor

This utility updates the low level codes of all items in the job and production schedule BOMs.



Appendix C: Additional implementation information

Operations

Current operations

An item that is produced on a production line represents a balanced flow of product from operation to operation. Therefore, the current operations that make up this production line should represent this balanced flow. That is to say, the rate per hour for each operation in the production line should be the same. Even though a given work center may have the potential to produce at a higher rate per hour, the rate per hour of that work center should be set to that of the production line.

Offset hours in current operations

Since a production line has a balanced flow, as soon as the first item is completed at the first operation, the product is passed to the next operation, and so on. The time that it takes to fill the line so that there is a part at each operation is insignificant. The Offset Hours for each operation in a production line should be set to zero. This will represent simultaneous production through each operation. This best represents a production line.

Setup hours in current operations

If setup hours are specified in the routing for a production schedule item, these setup hours are included in the scheduling of each production schedule release. Since setup is minimal or non-existent in a production line, the setup hours for most items should be set to zero.

Master production schedules

The Rate/Day field for an item is closely related to the Days Supply, Order Minimum, and Order Multiple fields on the master production schedule. The user must carefully consider the relationship between these fields so that the master production schedule firming process will logically produce valid production schedules.

Control point logic

Control points are the areas in the manufacturing facility where production reporting transactions are generated.

Multiple operations may be controlled by a single control point. The logic used to determine which operations are controlled by a control point is as follows:

All operations following the prior control point, or starting with the first operation if no prior control points exist, up to and including the control point operation itself

The following is what happens during the posting process for a control point transaction:

- Each operation controlled by the control point will be processed in turn, starting with the lowest operation number.
- All materials that are marked for backflushing will be backflushed.
- Scrap factor will always be applied to backflushed material issues.
- All labor, on operations with the Backflush field set to "Labor" or "Both", will be backflushed.
- All machine hours, on operations with the Backflush field set to "Machine" or "Both," will be backflushed.
- Appropriate overheads (material, machine, labor) will be calculated and posted. All calculated and posted amounts will be based on either the job routing and bill of material, production schedule routing and bill of material, or the current routing and bill of material depending on the transaction types used.

Reverse backflushing

Reverse backflushing will occur whenever negative quantities are completed on a job, production schedule, or just-in-time production transaction. Reverse backflushing may occur on multiple operations at a time, when negative quantities are completed for a control point.

When reverse backflushing materials, the cost of materials leaving the job will be based on the average cost of the materials issued to the job.

When reverse backflushing labor hours or machine hours, the rate (cost) of the hours being subtracted will be based on the job routing, production schedule routing, or the current routing, depending on the method of manufacture.

Reverse backflushing can only back out a maximum of 100% of total WIP. Reverse backflushing will not reduce WIP to negative amounts.

Backflushing does not relieve additional secondary or tertiary locations. If the On Hand Neg Flag check box on the Inventory Parameters form is selected, the system will take location inventory below zero.

Backflushing occurs when production is reported (quantities are completed and/or scrapped). Backflushing will not occur when manually changing the status of an operation to "Complete" or when running the Complete Job Operations utility.

Lot tracked and/or serial tracked items will not be backflushed.

Manual transactions for labor, machine time, and materials will be independent of backflushed transactions. Backflushing will be based solely on the quantity complete and scrapped on an individual transaction, ignoring any manual or backflushed amounts already posted.

For example, if the user inputs a manual transaction for a material issue of 100, and the material is also set to be backflushed, and then reports a quantity complete of 100, the system will backflush 100 and now 200 units will have been issued.

Costs and quantities associated with backflushed transactions will come from the job routing and bill of material, production schedule routing and bill of material, or the current routing and bill of material depending on the method of manufacture.



Appendix D: Summary of planning tools

What are the main planning tools?

There are three general ways to figure out what you need to make and when:

1. Time-phased netting of supply and demand
2. Simple netting of supply and demand
3. Hard peg of supply to demand

The system provides a number of tools you can use to support these methods.

Planner running in MRP mode (MRP)

Note: Other tools used include the material planner's workbench, planning detail display, and the Analyzer.

Planner running in APS mode (APS)

Note: Other tools used include the material planner's workbench, planning detail display, and the Analyzer.

Time phased inventory status (TPIS) form

Purchase requirements report (PRR)

Material availability report (MAR)

Material planner's workbench: inventory below safety stock (MPW: IBSS)

Material planner's workbench: Xref (MPW: Xref)

In this appendix we will summarize these tools and how they inform us what to manufacture and when.

The table below shows the key aspects of each tool and the general method it supports.

General Method	1				2		3
	MRP	APS	TPIS	MAR	PRR	MPW: IBSS	MPW: Xref
Automatically generates supply orders	Yes	Yes	No	No	No	Yes	Yes
Generates supply orders to meet due dates	Yes	Yes	No	No	No	No	No
Displays inventory levels over time	Yes	Yes	Yes	No ¹	Yes	No	No
Includes planned orders	Yes	Yes	No	No	No	No	No
Considers capacity	Yes	Yes	No	No	No	No	No
Constrains on capacity	No	Yes	No	No	No	No	No
Soft-pegs supply to demand	Yes	Yes	Yes	Yes	Yes	Yes	No
Hard-pegs supply to demand	No	No	No	No	No	No	Yes
Prevents planning before today	Yes	Yes	No	No	No	No	No

General Method	1				2		3
Calculation...	MRP	APS	TPIS	MAR	PRR	MPW: IBSS	MPW: Xref
Backwards plans	Yes	Yes	No	Yes	No	No	Yes
Requires BOMs	Yes	Yes	No	Yes	No	No	No2
<p>1It does use lead time and report shortages based on calculated need dates.</p> <p>2It does require BOMs if you want to create job/sub-job Xref structure.</p>							

MRP and APS

The planner lets you know which orders to create and when by providing planned orders with release and due dates. The planner works in real time--every demand order is planned as it is entered into the system. You can also get real time available-to-promise (ATP) or capable-to-promise (CTP) information at the time of order entry. Other non-order inputs are updated on a nightly basis.

This tool is superior in all environments except those where you lack BOM data.

The planner uses the same algorithms for each mode. The only differences between the two modes are the constraints.

Constraint	MRP	APS
Material	Constrains	Constrains
On-shift lead time	Constrains	Constrains
Capacity	Does not constrain	Constrains

You view, modify, and firm up these planned orders using the material planner's workbench.

Material Planner Workbench Generation form

You use this generation activity to copy a subset of all the planned orders to the workbench.

Material Planner Workbench Generation ×

Delete Planner's Batch - Yes No

Use Planned Data - Yes No

Source: Purchased Manufactured Transferred

Ending Date: * 10/24/2013

Planner Code:

Warehouse: MAIN

Buyer: abarlaan

Replenishment: Direct Transfer

Detail Errors

Planner Workbench Process

Process	Starting	Ending
<input type="checkbox"/> Item:		
<input type="checkbox"/> Order:		
<input type="checkbox"/> Project:		
<input type="checkbox"/> Transfer:		
<input type="checkbox"/> Job:	--	--
<input type="checkbox"/> SRO:		

Material Planner Workbench Generation form

Note: The Order Action Report provides the same information in hard copy.

Material Planner Workbench form

On the workbench, you review, modify, delete, and firm up planned orders.

The screenshot shows the 'Material Planner Workbench' interface. At the top, there is a 'View:' dropdown menu set to 'Production Schedule'. Below this are fields for 'User ID:', 'Planner Code:', and 'Description:'. On the right side, there is a vertical stack of buttons: 'Summary', 'Items', 'Time Phased', 'Planning Detail', 'Demand', 'Material Transactions', and 'Demand Summary'. In the middle section, there is a 'Process Through Date:' field with a calendar icon, and buttons for 'Process Through', 'Reset Process', and 'Generate Orders'. To the right of these buttons is a 'Filter' section with radio buttons for 'Today's Orders' (selected), 'This Week's Orders', and 'All Orders'. At the bottom, there is a table header with columns: 'Process Line', 'Item', 'Description', 'Fixed Lead Time', 'Release Date Order', 'Required Qty', 'Ready', and 'Sched ID'.

Material Planner Workbench form

Planning Detail form

You can use the planning detail display to see a time-phased view of inventory levels as well as parent orders and exception messages. You can also firm up planned orders. You will probably find that the workbench gives you more flexibility and control.

The screenshot shows the 'Planning Detail' form for item 908, 'Gear, 8 tooth'. On the left, there is a 'Select' list with items 1 through 20. The main area displays various fields: 'Item: 908', 'Product Code: FG-100', 'Last Gen Date: 10/22/2013', 'Planner: On Hand: 0.000', 'U/M: EA', 'Var Lead Time: 0.00000', 'Fixed Lead Time: 0 Days', 'Dock-to-Stock: 0 Days', 'Order Multiple: 0.00', 'Order Minimum: 0.00', 'Safety Stock: 0.000', 'Days Supply: 1', 'Reorder Point: 0.00', 'Fixed Order Qty: 0.00', 'Record Cap: 200', 'Date: Projected On Hand: 0.000', 'Site: Outstanding Requirement: 0.000', 'Outstanding Receipt: 0.000', 'Original Qty: 0.000', 'Reference: BALANCE ON HAND', 'Parent Item:', 'Parent Reference:', 'Exception Message:', 'Customer:', 'Release: End: Projected: Last Changed:'. There are also checkboxes for 'Net Change', 'MPS Flag', 'Use Reorder Point', 'Select', 'Firm', 'Changed', and 'Alternate'. On the right side, there is a vertical stack of buttons: 'Inventory Level', 'Demand Detail', 'Delay Detail', 'Reference', 'Exceptions', 'Master Planning Display', 'Pegging Display', and 'Price Request'.

Planning Detail form

For more information on the planner, see the *Planning Training Workbook*.

Master Production Schedule form

The screenshot shows the 'Master Production Schedule' form for item FA-10000. On the left, a list of items is displayed, with the first item (1) selected. The main area shows the following details:

- Item: FA-10000
- EA
- Bicycle, Model-30, 26"
- MPS Plan Fence: 90 Days
- Buttons: Component Shortages, Firm, Get CTP
- Due Date: 07/11/2012
- Projected Date: 12/02/2013
- Original Qty: 5.00
- Ref Num: 61
- Ready
- Available: 0.00

Master Production Schedule form

The Master Production Schedule (MPS) form is a collection of planned orders that have been manually created for key items. The user sets up these orders on the Master Production Schedule form using the MPS Processor activity.

You can use the Material Planners Workbench to firm MPS orders into job orders, production schedule releases, purchase orders, and transfer orders just as you do when firming planned orders created by the planner in MRP or APS mode.

MPS items are not planned by the planner in MRP or APS mode. However, the planner will plan for the items that are in the MPS item's BOM.

Time Phased Inventory Status form

The Time Phased Inventory Status helps you determine what and when to make an item by providing a view of inventory levels for an item over time. You would create orders for periods where you see inventory drop below an acceptable level. It is similar to the planning detail display but it does not include planned orders.

This tool is useful in repetitive environments with a manageable product mix. However, if you have BOM data, you will get more helpful data by using the planner.

The projected on-hand quantities are calculated from the following:

Order type	Status
Customer orders	Planned, Ordered
Purchase orders	Planned, Ordered
Job orders	Firm, Released
Transfer orders	Ordered, Transit

Notice that the form displays for each requirement or receipt, the need or supply date, projected inventory levels, the order information, and the customer (for customer orders) or vendor (for purchase orders).

If you highlight a line and click the X-Ref button, the system will open the order form for the order displayed in the Reference field.

Time Phased Inventory Status ×

Item: 908 Warehouse: MAIN
 Description: Gear, 8 tooth
 Quantity On Hand: 0.000 Reserved For Customer Orders: 0.000
 Starting Date:

Date	Projected On Hand	Requirement / Receipt	Source	Cust / Vend / Parent
1 ▶	0.000	0.000		BALANCE ON HAND
2 07/15/2012	8.000	8.000JOB	95-0	

Time Phased Inventory Status form

Material Availability Report form

The Material Availability Report form helps you determine the quantities available to promise (ATP) on a specified date. It informs you of all of the materials you will have shortages for on that projected date. If there are projected shortages, the report also projects the date on which you would be able to fill the order based on the critical path lead time through all levels of the BOM.

The report is also used in two other situations:

To verify that you have all material necessary before releasing jobs to the floor

To calculate a basis for MPS fence times

This tool is useful when you just want a rough idea of whether or not you can meet a demand. However, you can get more accurate data using the Planner's Get ATP/CTP function.

Material Availability Report ×

Include Top Level Item On Hand Show Shortages Only
 Use Safety Stock Subtract Allocs from On Hand
 Include Released Jobs Include Date Sensitivity for Allocs
 Include Ordered POs Display Report Header

Item:

Job: - 0000

Production Schedule ID:

Release:

Quantity Required: * 0.00

Date Required: * Increment Date

Include PS Release Status: Planned and Released

Warehouse:

Material Availability Report form

Form fields:

Date Required

This field shows the expected completion date for the job.

Use Safety Stock

This field identifies if the safety stock is considered available material. If selected, it indicates that it is available. If cleared, it subtracts the quantity from on hand when determining availability.

Include Released Jobs


If selected, it will increase the quantity on hand by any released jobs that are scheduled to be completed prior to the date required.

Include Ordered PO's

If selected, it will increase the quantity on hand by any ordered purchase orders that are due prior to the date required.

Subtract Allocations from On Hand

If selected, any allocations to jobs or customer orders will be subtracted from on hand quantities when determining availability.

Material Availability Report 

10/24/2013 3:22:10 PM

Source	Item	Qty Required	Qty Available	Quantity Short U/M	Date Order	Date Required	Reference
Manufactured	XCR-100	1.00	0.00	1.00 EA	9/30/2012	10/1/2012	
Manufactured	.XCR-200	1.00	0.00	1.00 EA	9/28/2012	9/30/2012	
Manufactured	..YPS-100	4.00	0.00	4.00 EA	9/27/2012	9/28/2012	
Purchased	...ZAL-100	4.00	0.00	4.00 FT	9/27/2012	9/27/2012	
Purchased	...ZAL-200	4.00	0.00	4.00 FT	9/27/2012	9/27/2012	
Purchased	..ZAL-200	6.00	0.00	6.00 FT	9/28/2012	9/28/2012	
Purchased	.ZAL-100	6.00	0.00	6.00 FT	9/30/2012	9/30/2012	

Critical Path Lead Time: 3 Mfg Days ASAP Date: 10/27/2013
WARNING: EARLIEST ORDER DATE IS PRIOR TO TODAY

Material Availability Report – sample output

Report output fields:

Qty Available

Availability status is given as the quantity required, quantity available, and the date required.

The quantity availability is determined by the current quantity on hand minus any allocations, with an option to include released jobs and/or purchase orders. If a shortage exists, the amount of shortage is given as well as an order date.

Critical Path Lead Time

Lead time required through all levels of the BOM to make this item. The report looks at each level of the BOM, determines which material at that level has the longest lead time, and then adds those material lead times together to get the critical path lead time.

ASAP Date

This is the current date plus the critical path lead time. The calculated "as soon as possible" date is based on forward scheduling given the availability of components. This takes into consideration both purchasing and manufacturing lead times. Resource capacity is not considered.



To locate available on-hand quantities from released jobs and ordered purchase orders, run the Purchase Requirements Report for the items in question.

The job scheduled end date and the purchase order line/release due date will display the quantities that will be available by the Material Availability Report order date.

Purchase Requirements Report

The Purchase Requirements Report helps you determine what to make and when by identifying displaying every item (manufactured, purchased, or transferred) for which an order should be placed to prevent the on hand quantity from going below safety stock.

It is usually used as an interim tool while in environments where planners are learning how to use MRP. This tool is useful only when you want a rough idea of what you need to make to maintain inventory levels. If you have BOM data, you can get more helpful and accurate planning data with the planner.

An item displays if the sum of its nettable quantities on hand, on order, and in process (On Hand, On Order, and Qty WIP fields) minus its quantities allocated to both orders and jobs (Alloc Job and Alloc Ord) is less than its safety stock quantity. The report will show the inventory levels over time and suggest a production quantity to bring the ending inventory level up to the safety stock level.

This report displays requirements and replenishments.

This input...	Includes...
Requirements	Customer orders or Allocation To Prod
Replenishments	Purchase orders or work in process (the item being manufactured)

There are different fields on the report depending upon whether a CO, a job, a WIP, or a PO is being displayed.

Purchase Requirements Report ×

Time Phase Detail
 Show Depletions
 Show Replenishments

Stocked: **Both** ▾
 Include Item Order Minimum/Multiple

Display Report Header

Material Type _____
 Material Other
 Fixture Tool

Source _____
 Manufactured
 Transferred
 Purchased

ABC Code _____
 A
 B
 C

PS Line/Release Status _____
 Planned
 Released

Customer Order Line/Release Status: Planned Complete
 Filled History
 Ordered

PO Line Release Status _____
 Planned Complete
 Filled History
 Ordered

Job Status _____
 Firm Stopped
 Released History
 Complete

Starting **Ending**
 Warehouse:
 Item:
 Product Code:
 Planner Code:

SRO Status _____
 Closed
 Open
 Estimate

Purchase Requirements Report form

Form fields:

Time Phase Detail

This field shows depletions and replenishments in date order.

Show Depletions

This field displays the source of each item's stock depletion.

Show Replenishments

This field displays the source of each items stock replenishment.

Material Type, Source, and ABC Code


These fields allow you to narrow your selection to items with the attributes you specify here.

PS, Customer Order, PO, and Job Status

These fields allow you to narrow your selection to only include order lines & releases with the statuses you select.

Starting and Ending Warehouse, Item, Product Code, and Planner Code

These fields allow you to narrow your selection to the ranges you specify here.

Purchase Requirements Report									
10/24/2013 3:25:11 PM									
Item	Description	Stocked	Planner	ABC	Lead Time Source				
U/M	U/M Description	On Hand	On Order	Alloc Mfg	Net Requirement	Vendor 1			
		Safety Stock	WIP	Alloc Order	Sugg Qty	Vendor 2			
HT-10000	Outside_Heat-Treating	No	OUT	C			5	Purchased	
LO	Lot	0.00	0.00	3.00	3.00	9		Wilcox Processes	
		0.00	0.00	0.00	3.00				

Purchase Requirements Report – sample output

Material Planner Workbench: Inventory below safety stock

The Material Planner Workbench (with an inventory below safety stock generation) helps you determine what and when to make an item by identifying whether the total demand for an item netted against the total supply for an item drives the inventory level below safety stock.

If an item's final inventory level is below safety stock, then it will generate a planned order for that item that you can then view, modify, and firm up into an actual order.

This tool is useful at distribution warehouses and can be used in conjunction with the Planner to meet their needs.

Material Planner Workbench Generation form

You use this generation activity to run the calculations. If you select the default warehouse as specified on the Inventory Parameters form, this activity will calculate the requirements for all warehouses. In all other cases it will calculate requirements for only the warehouse that you specify.

Process	Starting	Ending
<input type="checkbox"/> Item:		
<input type="checkbox"/> Order:		
<input type="checkbox"/> Project:		
<input type="checkbox"/> Transfer:		
<input type="checkbox"/> Job:	--	--
<input type="checkbox"/> SRO:		

Material Planner Workbench Generation form

Once you've generated planned orders, you can use the workbench to view, modify, and firm the orders.

Inventory Below Safety Stock Report form

You can view the same information in hard copy using the Inventory Below Safety Stock Report form.

Inventory Below Safety Stock Report ×

ABC Code	Material Type	Source
<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> Material	<input checked="" type="checkbox"/> Fixture
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> Tool	<input checked="" type="checkbox"/> Other
<input checked="" type="checkbox"/> C		<input checked="" type="checkbox"/> Purchased
		<input checked="" type="checkbox"/> Manufactured
		<input checked="" type="checkbox"/> Transferred

Exclude Zero Net Requirement Items Stocked: Both

Include Transfers Display Report Header

Starting	Ending
Warehouse: 	
Item: 	
Product Code: 	
Planner Code: 	

Preview
Print

Inventory Below Safety Stock Report form

Inventory Below Safety Stock Report

10/24/2013 3:27:55 PM
Whse: MAIN

Safety Stock	Lead Time	On Hand	On Order	WIP	Alloc Prod	Alloc Cust	Alloc Transfer	On Transfer
Item				Planner			Net Requirement	Suggested Qty
Description				Vendor #1	Vendor Name		Vendor Item #1	
				Vendor #2			Vendor Item #2	
TC-10000	10.00	6	5.00	0.00	5.00	0.00	0.00	0.00
Tablet Computer with Smart Cover				FG			0.00	0.00

Inventory Below Safety Stock Report – sample output



Appendix E: Form navigation

Where to find repetitive manufacturing forms

The table below lists a variety of forms that are useful for repetitive manufacturing. The navigation path to each form is also listed.

Form title	Navigation path
Change Production Schedule Release Status	Production > Work Centers > Utilities
Copy Production Schedules	Production > Production Schedules > Activities
Copy Routing BOM	Production > Production Schedules > Activities
Current Materials	Material > Product Definition
Current Operations	Material > Product Definition
Delete Shift Exceptions	Production > Work Centers > Utilities
Departments	Employee > HR > Organization
Engineering Workbench	Material > Product Definition
Floor Stock Replenishment Report	Production > Work Centers > Reports
Generate Production Schedules	Production > Production Schedules > Activities
Inventory Below Safety Stock Report	Material > Inventory > Reports
Inventory Parameters	Codes > Parameters
Items	Material > Inventory Material > Product Definition
Items to Be Completed Report	Production > Scheduling > Reports
Just-in-Time Production Transactions	Production > Production Schedules > Activities
Lead Time Processor	Material > Inventory > Utilities
Locations	Material > Inventory
Master Production Schedule	Material > Planning
Material Availability Report	Production > Work Centers > Reports
Order Action Report	Material > Planning > Reports
Order Status Report	Customer > Order Entry > Reports
Product Codes	Inventory > Files
Production Exceptions Report	Production > Scheduling > Reports
Production Schedule Complete Transactions	Production > Production Schedules > Activities
Production Schedule Items	Production > Production Schedules
Production Schedule Materials	Production > Production Schedules

Form title	Navigation path
Production Schedule Operations	Production > Production Schedules
Production Schedule Scrapped Transactions	Production > Production Schedules > Activities
Production Schedules	Production > Production Schedules
Purchase Requirements Report	Vendor > Purchase Orders > Reports
Resource Groups	Production > Work Centers
Resources	Production > Work Centers
Shop Floor Control Parameters	Codes > Parameters
Time Phased Inventory Status	Material > Inventory
Work Center Labor Transactions	Production > Work Centers > Activities
Work Center Machine Transactions	Production > Work Centers > Activities
Work Center Material Transactions	Production > Work Centers > Activities
Work Centers	Production > Work Centers