11*i* Setting Up and Implementing Flow Manufacturing

Student Guide

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Preface

Profile

Before You Begin This Course

Before you begin this course, you should have the following qualifications:

- Thorough knowledge and proficiency in navigating Oracle applications
- Working experience with *a working knowledge of the manufacturing business process*

Prerequisites

- *Oracle Inventory*

- *Oracle Bills of Material and Oracle Engineering*

- *11i Overview of Flow Manufacturing (e-class)*

- *11i Managing Demand in a Flow Environment (e-class)*

- *11i Designing and Balancing Flow Lines (e-class)*

- *11i Sequencing and Scheduling Flow Lines (e-class)*

- *11i Executing Flow Line Production (e-class)*

- *11i Planning and Executing Kanbans (e-Class)*

How This Course Is Organized

This is an instructor-led course featuring lecture and hands-on exercises. Online demonstrations and written practice sessions reinforce the concepts and skills introduced.

Related Publications

Oracle Publications

Title	Part Number
Oracle Inventory User's Guide	*A83507-01*
Oracle Bills of Material User's Guide	*A75087-01*
Oracle Master Scheduling/MRP and Oracle Supply Chain Planning User's Guide	*A82941-01*
Oracle Flow Manufacturing User's Guide	*A69396-01*
Oracle Work in Process User's Guide	*A83598-01*

Additional Publications

- System release bulletins

- Installation and user's guides

- *read.me* files

- *Oracle Magazine*

Typographic Conventions

Typographic Conventions in Text

Convention	Element	Example
Bold italic	Glossary term (if there is a glossary)	The **algorithm** inserts the new key.
Caps and lowercase	Buttons, check boxes, triggers, windows	Click the Executable button. Select the Can't Delete Card check box. Assign a When-Validate-Item trigger to the ORD block. Open the Master Schedule window.
Courier new, case sensitive (default is lowercase)	Code output, directory names, filenames, passwords, pathnames, URLs, user input, usernames	Code output: `debug.set ('I", 300);` Directory: `bin` (DOS), `$FMHOME` (UNIX) Filename: Locate the `init.ora` file. Password: User `tiger` as your password. Pathname: Open `c:\my_docs\projects` URL: Go to `http://www.oracle.com` User input: Enter `300` Username: Log on as `scott`
Initial cap	Graphics labels (unless the term is a proper noun)	Customer address (*but* Oracle Payables)
Italic	Emphasized words and phrases, titles of books and courses, variables	Do *not* save changes to the database. For further information, see *Oracle7 Server SQL Language Reference Manual.* Enter `user_id@us.oracle.com`, where *user_id* is the name of the user.
Quotation marks	Interface elements with long names that have only initial caps; lesson and chapter titles in cross-references	Select "Include a reusable module component" and click Finish. This subject is covered in Unit II, Lesson 3, "Working with Objects."
Uppercase	SQL column names, commands, functions, schemas, table names	Use the SELECT command to view information stored in the LAST_NAME column of the EMP table.

Convention	Element	Example

Arrow	Menu paths	Select File—> Save.
Brackets	Key names	Press [Enter].
Commas	Key sequences	Press and release keys one at a time: [Alternate], [F], [D]
Plus signs	Key combinations	Press and hold these keys simultaneously: [Ctrl]+[Alt]+[Del]

Typographic Conventions in Code

Convention	Element	Example
Caps and lowercase	Oracle Forms triggers	`When-Validate-Item`
Lowercase	Column names, table names	`SELECT last_name FROM s_emp;`
	Passwords	`DROP USER scott IDENTIFIED BY tiger;`
	PL/SQL objects	`OG_ACTIVATE_LAYER (OG_GET_LAYER ('prod_pie_layer'))`
Lowercase italic	Syntax variables	`CREATE ROLE role`
Uppercase	SQL commands and functions	`SELECT userid FROM emp;`

Typographic Conventions in Navigation Paths

This course uses simplified navigation paths, such as the following example, to direct you through Oracle Applications.

(N) Invoice > Entry > Invoice Batches Summary (M) Query > Find (B) Approve

This simplified path translates to the following:

1. (N) From the Navigator window, select Invoice > Entry > Invoice Batches Summary.

2. (M) From the menu, select Query > Find.

3. (B) Click the Approve button.

Notations :

(N) = Navigator

(M) = Menu

(T) = Tab

(I) = Icon

(H) = Hyperlink

(B) = Button

Typographical Conventions in Help System Paths

This course uses a "navigation path" convention to represent actions you perform to find pertinent information in the Oracle Applications Help System.

The following help navigation path, for example—

> (Help) General Ledger > Journals > Enter Journals

—represents the following sequence of actions:

1. In the navigation frame of the help system window, expand the General Ledger entry.

2. Under the General Ledger entry, expand Journals.

3. Under Journals, select Enter Journals.

4. Review the Enter Journals topic that appears in the document frame of the help system window.

Getting Help

Oracle Applications provides you with a complete online help facility.

Whenever you need assistance, simply choose an item from the Help menu to pinpoint the type of information you want.

To display help for a current window:

1. Choose Window Help from the Help menu, click the Help button on the toolbar, or hold down the Control key and type 'h'.

   A web browser window appears, containing search and navigation frames on the left, and a frame that displays help documents on the right.

   The document frame provides information on the window containing the cursor. The navigation frame displays the top-level topics for your responsibility, arranged in a tree control.

2. If the document frame contains a list of topics associated with the window, click on a topic of interest to display more detailed information.

3. You can navigate to other topics of interest in the help system, or choose Close from your web browser's File menu to close help.

Searching for Help

You can perform a search to find the Oracle Applications help information you want. Simply enter your query in the text field located in the top-left frame of the browser window when viewing help, then click the adjacent Find button.

A list of titles, ranked by relevance and linked to the documents in question, is returned from your search in the right-hand document frame. Click on whichever title seems to best answer your needs to display the complete document in this frame. If the document doesn't fully answer your questions, use your browser's Back button to return to the list of titles and try another.

11*i* Setting Up and Implementing Flow Manufacturing

Chapter 1

11i Setting Up and Implementing Flow Manufacturing

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Objectives

Objectives

After this course, you should be able to do the following:

- Define the categories of features contained in the Oracle Flow Manufacturing system
- Describe the setup objectives and prerequisites for each category
- Describe the setup steps by category

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Agenda

Agenda

- **Overview**
- **Managing Demand**
- **Designing and Balancing Flow Lines**
- **Sequencing and Scheduling Flow Lines**
- **Executing Flow Line Production**
- **Planning and Executing Kanbans**
- **Summary**

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Overview

Overview

- **Flow Manufacturing requires teamwork and organization. The teamwork and organization must start in the planning and setup stages of implementation. Oracle Flow Manufacturing setup steps may be classified into logical groups assigned to each of the business processes to achieve specific implementation objectives, such as:**
    - **Total business strategy to attain market leadership**
    - **Total quality management**
    - **Reduction in manufacturing cycle time**
    - **Reduction in product costs**

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Prerequisites

Prerequisites

The following Oracle Applications play a necessary part in the execution of *Oracle Flow Manufacturing*:

- **Oracle Inventory**
- **Oracle BOM/ENG**
- **Oracle Order Management**
- **Oracle Planning**
- **Oracle Purchasing**
- **Oracle Work In Process**

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References

Refer to the *Oracle Flow Manufacturing Implementation Manual* for detailed information regarding each of the topics for setting up and implementing the system.

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Managing Demand: Overview

The goal of demand management is to define the anticipated market share percentage in terms of a product mix. Once the product mix is defined, the products can be grouped into families based on the communality of processes that they go through.

After families are created, usually one per line, the production lines are designed to build all the items in that family in a mix model basis. Oracle Flow Manufacturing enables you to analyze demand, group products into product families, and manage demand on a day by day basis.

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Managing Demand: Overview

You should be able to:

- **Determine your demand planning method.**
- **Describe your demand and Product Families.**
- **Create Product Families to group products with common processes.**
- **Create a forecast to use for designing your line and kanbans.**
- **Create MDS/MPS and MRP plans as required for long term planning.**

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Process Steps

Process Steps

- **Determine planning method**
  - Independently
  - Forecast explosions
  - Two level scheduling
- **Understand demand and supply chain for the business**
  - Managing demand to within flexible tolerance fences
- **Generate product and process matrix**
- **Define Items**
- **Define Families and Assign Members (Optional)**
  - Product Family
  - Product Families Versus Planning Bills
  - Set-up Product Family Profile Option
  - Create Product Family
  - Add Members to Product Families
  - Confirm the Automatic Category Set Assignment

Process Steps

Process Steps

- **Create Forecast**
  - Prerequisite: Create Forecast Sets
  - Define a Forecast
  - Forecast Product Families
- **Master Demand Schedule (Optional)**
  - Define a MDS Plan Name
  - Load a Master Schedule
- **Optionally create a Master Production Schedule (MPS)**
  - Define Plan Name and Options
  - Launch the MPS Plan
  - Rough-Cut Capacity Planning (Optional)
- **Available to Promise (optional)**
  - Member Available to Promise
  - Product Family Available to Promise

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Review Question

Review Question

Which of the following are prerequisites for implementing Oracle Flow Manufacturing?

1. Oracle Inventory

2. Oracle Order Management

3. Oracle Purchasing

4. all of the above

5. none of the above

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Answer to Review Question

Which of the following are prerequisites for implementing Oracle Flow Manufacturing?

1. Oracle Inventory

2. Oracle Order Management

3. Oracle Purchasing

4. all of the above

5. none of the above

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Overview

Overview

Line design and balancing is the heart of flow manufacturing. Your time spent to accurately define your current process, then analyze it to divide up into equal line operations is essential to an efficient and productive line.

Oracle Flow Manufacturing enables you to model your current manufacturing process in detail through flow routings, then use a mixed model map to view your line balance and make decisions on how to improve that balance.

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Process Steps

Process Steps

- **Define Items and Organizations - to define the inventory organizations and the items to be produced.**
- **Define Product Families and generate a capacity demand forecast for the product family.**
- **Set-up a Line name - to define the flow line, production resources, and departments.**
- **Create a Flow Routing (or Product Synchronization) - to define the current events and processes in the flow line for all your products.**
  - **Standard Processes**
  - **Standard Operations**
  - **Standard Events**

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Process Steps

Process Steps

- **Generate a mixed model map to view the mixed model calculations based on your flow routing and product family forecast.**
- **Return to your flow routing to re-align events into balance operations.**
- **Re-generate your mixed model map to confirm your operations are balanced.**
- **Save your newly balanced mixed model map as a baseline to which you can compare actual production.**

Considerations

- Cumulative and reverse cumulative yields are the product of yields at each operation along any path.

- The net planning % is used in the MMM to calculate process volumes through each process and considers alternate paths. It is also used by kanban planning to adjust demands for kanbans.

- Calculated Labor Time: The sum of both scheduled and unscheduled labor resource usage rates for each event.

- Calculated Machine Time: The sum of both scheduled and unscheduled machine resource usage rates for each event.

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Considerations

Considerations

- **Calculated Elapsed Time:** The sum of the scheduled Labor and Machine usage rates for each event.

- **User Entered Times:** If you don't want to use the system calculated times, you can enter your own manual times for processes, operations, or events.

- **Total Cycle Time (TPCT):** The sum of the Elapsed times along the longest primary path of your routing network.

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Balancing Your Line

Once you have set-up your current line by defining items and organizations, the flow line, a forecast, and the product routings, you can balance the line through iterative processes using the mixed model map.

- Set up parameters to generate the mixed model map.

- Generate the mixed model map based on current processes.

- Analyze mixed model map results and balance the line by re-aligning events into line operations.

- Regenerate the mixed model map.

- Save your balanced line as the baseline.

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Line scheduling is equal to line design and balancing in terms of importance. If you design your line perfectly to your average daily demand mix, but you schedule it improperly, you could cause excessive change-overs, unbalanced demand on resources, or large peaks in demand to your kanbans. Either of these will undermine your line's ability to perform to takt.

You can create and use simple scheduling rules to schedule either sales or planned orders for your flow line.

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Line Scheduling Functions

You can:

- **Create a scheduling rule based on pre-defined sequencing criteria and scheduling algorithms, or create your own rules and assign them to the application.**

- **View all unscheduled orders for your line and choose which orders you want to schedule.**

- **Schedule the line and view the final flow schedule.**

- **Schedule planned orders from material planning.**

- **Synchronize feeder lines with final production lines.**

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Process Steps

Process Steps

- **Define your system or user defined scheduling rules**
- **Define your own scheduling rules**
  - **Sequencing criteria**
  - **Scheduling algorithms**
- **Define your line rate**
- **Define schedule groups**
- **Setup WIP Accounting Class Code**
- **Choose a scheduling rule, view unscheduled orders, implement orders, and view schedules**
- **Synchronize a Feeder Line**

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Considerations

Considerations

- **Integrated line scheduling and work order-less completions**
    - Completion of a scheduled flow schedule
    - Completion of an unscheduled work order-less order

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Overview

Overview

Oracle Flow Manufacturing enables you to reduce the number of non-value added transactions needed on your shop floor. This is done through work order-less completions.

- **Complete assemblies with or without creating a job, repetitive schedule, or flow schedule.**
- **Backflush all components based on the assembly bill, or add/delete components for a particular completion.**
- **Charge resources and overhead based on the Flow Routing.**

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Overview

- **Complete assemblies to a designated completion sub-inventory/locator.**
- **Perform Lot/Serial Control.**
- **Return previously completed items to stock.**
- **Scrap assemblies and consumed components at any operation on the line.**
- **Integrate quality collection plans with completions.**

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Process Steps

Process Steps

- **Set up component Supply Types**
- **Assign routing events to BOM components**
- **Determine WIP backflush parameters**
- **Define manufacturing costing method**
- **Set up lot/serial control (optional)**
- **Set up a Quality collection plan (optional)**

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Overview

Oracle Flow Manufacturing uses a kanban pull replenishment system to signal material requirements and to pull material from its defined source as needed to meet daily customer demand.

The objectives of the kanban replenishment system are to continuously improve the production with zero stockouts, shorter lead times, and reduced inventory with minimal manual supervision.

Instead of waiting for an MRP plan to push materials to the floor, each operation pulls the material it needs from its sources at the time it needs it, signaling with a replenishment signal.

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Kanban Functions

Oracle Flow Manufacturing enables you to create and use kanban replenishment chains to re-supply your line.

- **Create kanban pull sequences to replenish from other internal organizations (inter-org), suppliers, production lines, and other sub-inventories within your organization (intra-org).**

- **Calculate either kanban size or number of cards required for each pull sequence based on demand and pull sequence parameters.**

- **Simulate changes to any of the kanban parameters in the kanban workbench prior to updating your production kanbans.**

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Kanban Functions

- **Compare kanban calculations between two separate plans (for example, compare current forecasted demand to what you are using today (the Production plan).**

- **Generate and print kanban cards for all source types.**

- **Replenish cards, and have the system automatically create the appropriate purchase order, production schedule, or move order.**

- **View the current status of your cards (full, empty, in-process, in-transit, etc).**

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Process Steps

Process Steps

- **Determine Kanban Location Naming Conventions**
- **Set up sub-inventories**
- **Assign subinventory and locator information to BOMs and items**
- **Set up Kanban items**
  - **Production type data**
  - **Supplier type data**
  - **Inter-org type data**
  - **Intra-org type data**

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Process Steps

Process Steps

- **Define Kanban pull sequences**
- **Create Kanban plans**
    - **Define Kanban plan name**
    - **Launch Kanban plan**
- **Create production Kanbans**
    - **View details on the Kanban Workbench**
    - **Select all pull sequences**
    - **Update production**

Note: This is a one-time procedure to populate the production Kanbans.

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