

ORACLE FLOW MANUFACTURING

KEY FEATURES

ORACLE FLOW MANUFACTURING PROVIDES THE FOLLOWING CAPABILITIES CRITICAL FOR A LEAN, MIXED MODEL MANUFACTURER:

- Value stream mapping to identify opportunities for improvement
- Line design to create balanced lines that support mixed model production of standard or configured product
- Sequencing and scheduling capabilities to produce directly to customer order
- Pull-based, kanban replenishment chain to improve inventory turns
- Synchronized component replenishment for configured or build to order components
- Lean manufacturing execution workstation for operators to enable companies to move toward a paperless shop floor
- Lean planning throughout the suite to support your lines during long term planning processes

Oracle Flow Manufacturing is a comprehensive manufacturing software solution that supports demand driven flow and lean manufacturing techniques designed to reduce product cycle times, minimize inventories, simplify production, and improve product quality. These techniques provide manufacturing operations with the ability to quickly respond to changing customer needs in an e-business environment. Oracle Flow Manufacturing is part of the Oracle E-Business Suite, an integrated set of applications that are engineered to work together.

Understand and Improve Your Process with Value Stream Mapping

Value Stream Mapping enables you to understand the business process, identify waste and look for opportunities for improvement. The Graphical Line Designer in Oracle Flow Manufacturing can be used to map out your current, as-is value streams, which can then be redesigned in to balanced line operations.

The graphical workbench uses drag-and-drop techniques to select and associate processes and line operations with the detailed events required to build your product. This tool enables you to define and associate standard processes or operations with configurable models and product families, link the processes or operations to each other as primary, feeder, and/or rework. It enables you to identify events that are important to your total quality initiatives, and indicate which events are non-value added. You can associate your graphical, text or video work instructions to events.

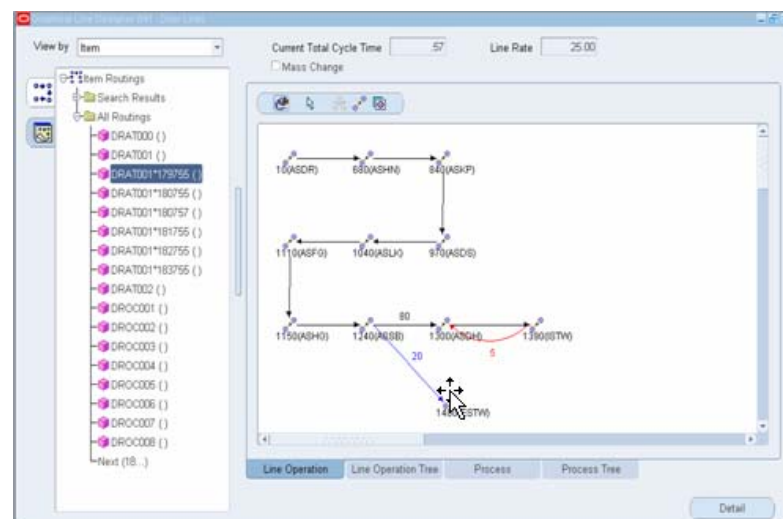


Figure 1: The Graphical Line Designer links operations to each other as primary, feeder, and/or rework processes

Reduce Cycle Time and Lower Cost with Line Design and Balancing

Oracle Flow Manufacturing helps you reduce your product cycle times through line design and balancing. Reduced cycle time directly translates to reductions in cost by reducing the amount of work in process, the amount of component inventory, and the amount of rework and scrap. Reduced cycle times will also help you achieve on-time delivery of customer orders.

You can design production lines to make one or more families of products. Oracle Flow Manufacturing lets you determine daily rates for mixed model production and plan for the optimal resources needed to balance production. In the Mixed Model Map Workbench you can view the line and operation takt and resource requirements based upon the demand chosen. You can view a comparison of the calculated suggested labor and machine resources with the actual assignments of resources to the line operations and across lines in the case of shared resources. You can view the takt time, process capability and effectiveness related to value added tasks based upon the actual assignments. This allows you to identify and resolve potential bottlenecks caused by production demand, line design and resource assignments. This also identifies specific areas where process improvement activities should be directed. It can be used in conjunction with the Graphical Line Designer to re-organize events into balanced line operations.

You may use the mixed model map workbench to model what-if scenarios. Add or remove resources, change demands and product mix over time and determine what your future state should be.

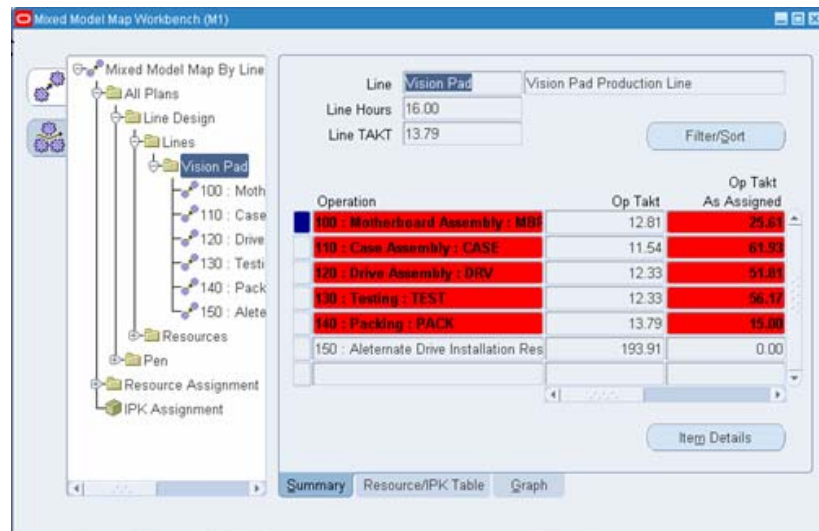


Figure 2: The Mixed Model Map Workbench calculates takt time and highlights imbalances

Build to Demand with Sequencing and Scheduling

The Flow Sequencer, the Line Scheduling Workbench and the Mixed Model Map Workbench provide planners and schedulers the ability to plan, simulate, and schedule production lines to meet actual customer demand. This functionality is anchored around the Line Scheduling Workbench from which the scheduler can perform tasks such as scheduling and component availability checking. For a given

line, all scheduled orders - WIP discrete jobs, repetitive schedules, and flow schedules - can be viewed in the workbench. The Line Scheduling Workbench provides a variety of rate based scheduling rules. They support a range of strategies, from tightly synchronizing supply to customer demand with no level loading to generating a mixed model schedule that repeats the lowest level recurring pattern that fulfills your customer demand. The rate based scheduling rules also provide sequencing criteria to prioritize the demand to be scheduled. The sequencing attributes include: Order Schedule Date, Order Promise Date, Order Request Date, Order Priority, and Order Entry Date.

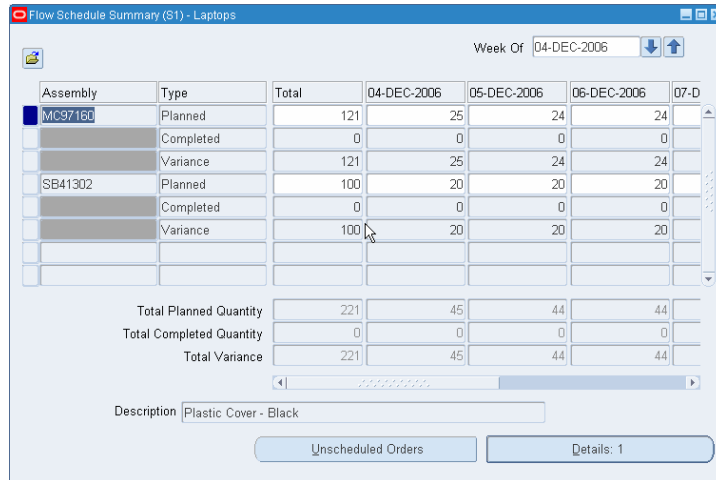


Figure 3: Flow Schedule Summary - Scheduled Customer Demand by Day

Constraint based sequencing is provided by the Flow Sequencer. This functionality allows the user to specify what data attributes of a Sales Order, Planned Order, Item, Item Component or Routing will be used as constraining variables. These variables are then grouped and combined with constraint to form rules. These user defined rules are then used to model the logical and physical constraints of the production lines as demand is schedule to ensure the effective use of resources through the creation of balanced work loads on line operations.



Figure 4: Constraint Based Scheduling Rule

Reduce Inventory with Flexible Component Replenishment

Oracle Flow Manufacturing has multiple component replenishment methods that can support multiple component demand patterns. The flexibility will help eliminate

stock-outs by automating the material replenishment process and creating a self-regulating pull system.

Synchronized Material Supply

For components that are configured or built to customer order, or have a large amount of variation, Feeder Line Synchronization process may be used to create just in time schedules for dependent demand such that the components are delivered when they are needed. Similarly, components required from suppliers can be ordered with their delivery synchronized to the production sequence.

Pull Based Kanban Replenishment

For components with relatively stable demand that can fit easily on the line, material is replenished via kanban pull sequences. In this case, material replenishment is supported by kanban pull sequences, a relationship between a point of use for a material and its point of supply. You can integrate both your internal and external supply organizations into your manufacturing replenishment chain using kanbans. You can automate the release of supplier kanbans against blanket purchase orders. Additionally, you can automate the execution of production kanbans whose signals create a discrete job, repetitive schedule, or flow schedule. Kanban cards can be used to initiate transfer orders to move material from a central stocking location to a production line stocking location or point of use location. You can use alerts to notify planners or shop floor supervisors that an electronic request for replenishment of a flow line has occurred. All related kanban transactions are fully supported by the Mobile Supply Chain Applications (MSCA).

The screenshot shows the 'Pull Sequence' form in Oracle. It is divided into several sections:

- Item Information:** Item Name: CM93501, Mounting Bracket Left Hand.
- Point of Use:** Subinventory: KB1, Locator: (empty).
- Point of Supply:** Type: Inter Org, Supplier: M2 Boston Manufacturing, Site: (empty), Subinventory: FGI, Locator: (empty), Line Code: (empty).
- Kanban Settings:** Planning Only: , Auto Request: . Calculate: No of Cards (dropdown), Number Of Cards: 9, Size: 25 (dropdown), Minimum Order Qty: (empty).
- Planning:** Lead Time: 5, Lot Multiplier: 25, Safety Stock Days: (empty).
- Buttons:** Generate Cards (with a small icon), OK, and Cancel.

Figure 5: Kanban Definition. Define kanbans for just-in-time replenishment of material.

Kanban replenishment is planned for based upon anticipated design volumes, and calculates the optimal number of kanbans or kanban sizes needed to meet the customer demand. You can also compare and adjust production kanbans against kanban requirements for varying demands, including the demand represented by scheduled production.

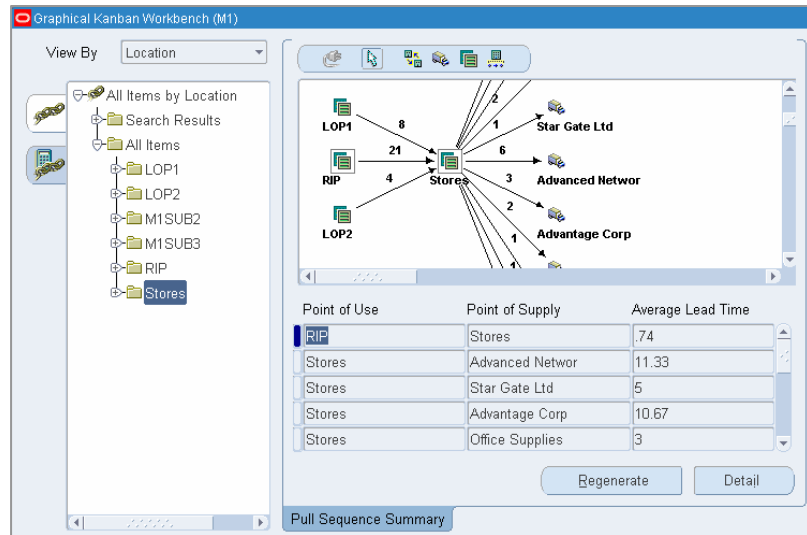


Figure 6: Graphical Kanban Workbench – Summary View by Sub-inventory location

Pick Components

Finally, components that are large or have very infrequent usage can be picked to schedule and delivered to the line as needed.

Increasing Operator Efficiency and “Go Paperless” with Lean Manufacturing Execution

The Flow Execution Workstation provides line operators and line supervisors an intuitive user interface for managing production execution, and can enable a paperless shop floor. It provides a number of preference settings that allow users to control the process, content and layout of the display. Settings control if a work queue is displayed or if an operator must enter (scan) a schedule number to proceed. Line level controls allow for the automatic generation of pick requests for ‘push’ components and the printing of ‘line start’ and ‘operation completion’ labels. Page controls can specify both the sequence of information presented to the operator and the content of the information. Operation Method Sheets or other work instructions can be set to automatically display, and the operator can page through them if more than one is required. These work instructions can include any multi-media information ranging from videos, to CAD drawings, to simple work instructions. Lot and serial information for the assembly or any components, and component substitution can be captured at any point during the process, and that information is used during the work order completion at the end of the process. Quality data collection can also be done and enforced at any point in the process. Kanban replenishments may be triggered and notice may be given of pending or recently implemented ECOs.

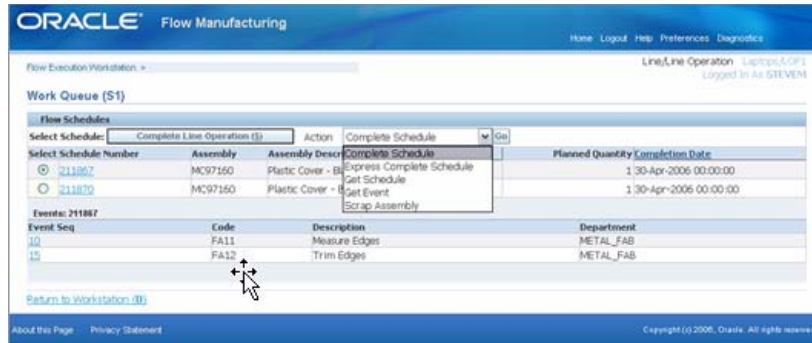


Figure 7: Flow Workstation Work Queue and Schedule Events at a Line Operation

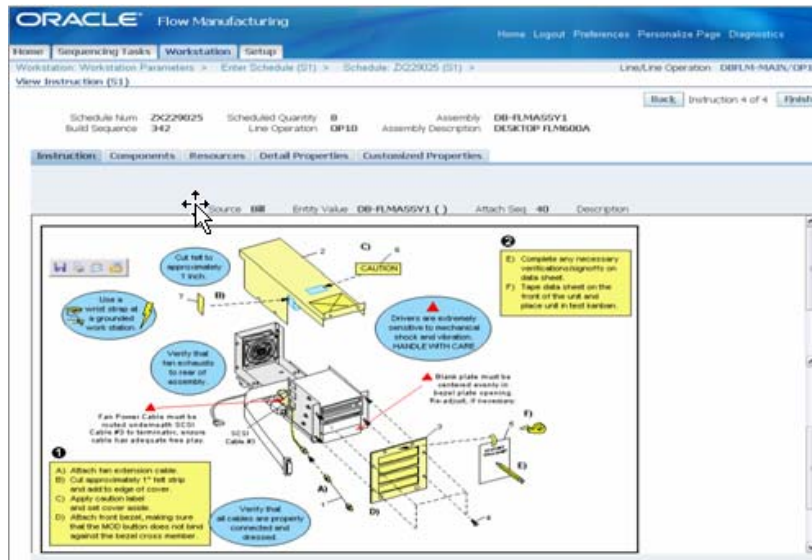


Figure 8: On line display of Work Instructions

Build High Quality Products with Integrated Quality Plans

Inherent in a flow sequence of events are specific quality verification tasks. Typically, TQC tasks check the work of the previous operation; verify tasks are performed before passing the assembly downstream. Flow routings support this structure and allow for the attachment of specific detailed calibration tables and collection plans. In addition to performing the quality tasks, you can collect quality data as you perform work orderless completion transactions, or during an operation completion in the Flow Execution Workstation. You can collect data either by direct data entry or in the background, as well as retain any quality data associated with lot and serial numbers. Once you associate a collection plan with a flow transaction, it automatically transfers contextual data from the transactions into the quality collection plan. Optionally, you can make collection plans mandatory and require the collection of quality data before completion transactions can be processed. The use of collection plans and quality tasks reduces rework and scrap and produces a higher quality product.

Simplified Production Execution with Work Orderless Completions

You can improve your time-to-market by engineering production processes that are simple to manage and efficient to execute. Oracle Flow Manufacturing allows you to

KEY BENEFITS

Oracle Flow Manufacturing enables companies to:

- Transition to and institutionalize their lean practices, resulting in reduced cycle time, improved quality, and improved on-time customer delivery.
- Full support is provided from planning through execution to support a demand driven, pull based replenishment chain.

RELATED PRODUCTS:

- Discrete Manufacturing
 - Work in Process
 - Quality Management
 - Project Manufacturing
 - Inventory
 - Bills of Material
 - MRP
 - Cost Management
- Flow Sequencing
- Advanced Planning and Scheduling
- Collaborative Planning
- Inventory Optimization
- Global Order Promising
- Mobile Supply Chain Applications

record completions of assemblies without having to create work orders. The system will backflush all the components and perform resource and overhead transactions upon recording the assembly completion. You can use linearity reporting to monitor the performance of your production lines. Linearity reporting measures actual production compared to scheduled production over time, an important measurement tool in a lean environment. While flow manufacturing reduces the need for scrap and rework, Oracle Flow Manufacturing allows you to scrap assemblies and return from scrap at any operation using either scheduled or unscheduled flow schedules. A scrap transaction will cause all the components through the scrap operation to be backflushed.

All related production transactions are fully supported by the Mobile Supply Chain Applications (MSCA).

Lean Planning Throughout the Enterprise

Oracle Flow Manufacturing, integrated with Oracle Planning products, lets you reduce product costs by helping you increase your inventory turns and reduce your inventories. This is achieved by reducing work in process inventory, reducing finished goods inventory, and by reducing raw material stock through cycle time reductions.

For long term planning with advanced planning and scheduling, planned orders for the final assembly can be constrained by the line rate defined in manufacturing, and is used for order promising based on line rate.

Collaborative Planning supports both VMI and Consigned inventory, and Inventory Optimization can be used to help companies determine postponement strategies.

Oracle E-Business Suite—The Complete Solution

Oracle E-Business Suite enables companies to efficiently manage customer processes, manufacture products, ship orders, collect payments, and more—all from applications that are built on a unified information architecture. This information architecture provides a single definition of your customers, suppliers, employees, products—all aspects of your business. Whether you implement one module or the entire Suite, Oracle E-Business Suite enables you to share unified information across the enterprise so you can make smarter decisions with better information.

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