Kanban
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Kanban Execution

Overview

Kanban is a Japanese word that literally means billboard sign. The term has been modified in its application to manufacturing activities to mean card or ticket. Toyota originally developed kanban manufacturing techniques. The Toyota approach used cards as a signal that additional items were required to meet production schedules. So in its simplest form kanban manufacturing uses a card to signal someone that an action is required to supply additional items to the shop.

The use of kanban manufacturing techniques will help a company move to a just in time (JIT) manufacturing environment. This then becomes one of the tools that can be used by a company to be more competitive in today’s environment.

Introduction

Many companies have used enterprise resource planning (ERP) systems to gain control of the various functions that are necessary to make product on time and at a profit. These companies have also found that in addition to the capabilities of the traditional ERP system they require tools that will help them insure that the plan that was established will allow the best possible execution of schedules. Kanban is a tool that will support ERP planning and help a company move to JIT manufacturing.

In a typical environment ERP will be used to develop the plan that will be used by a company. Other tools can then be used to insure the best possible performance to that plan. Kanban can be one of these execution tools. Kanban then is a tool that will support the plan that has been developed by other applications in the ERP system. It does this by providing the best possible flow of items in support of that plan.

Kanban methods of helping execute the plan normally take one of two approaches, a single or two card system. A single kanban method is typically satisfactory for a simple manufacturing environment. When this approach is used a single card moves with the material from one work center to another. When additional material is required the card is sent back to the supplying work center so that additional material can be produced. In a two card system a production card and a move card are printed. The move card stays with the material and identifies where the material should be moved. The production card is an authorization to make additional quantities of an item. The two card method of kanban control provides a more flexible solution for a wider range of manufacturing environments.
JIT is supported by kanban planning because the quantities that are identified by the kanban are typically smaller than the order quantities found for lot sizes. The smaller quantities allow the user to function in an environment where material deliveries are done much closer to the actual requirement for the item. These quantities are defined as the quantity of the item that will fit in a container. The planning of material movements is done based on these container quantities. The amount of work in process (WIP) inventory can be controlled by the number of containers and the amount of material in each container.

The Glovia kanban functionality uses the two card method of kanban execution.

A production kanban for item A would use inventory of its components B and C. When item A has been produced it would be moved to stock. The use of items B and C would generate a move kanban so that additional components could be moved from a store location to the shop floor.

The user will be able to control the quantity of material on hand at any point by controlling the number of active kanban cards. As fewer cards are included in the process the level of inventory will decrease. This will allow the organization to gain greater control over inventory and move closer to a JIT environment. Ultimately the use of the kanban cards can be linked to vendor supplies so that the correct container quantities will be used. The delivery of the purchased material can also be tied directly to the planning that is being done with the rest of the ERP system. This will allow the company to perform in a JIT environment with both WIP and purchased items.

Additionally, when dealing with purchased items the user may be able to plan for multiple deliveries of material on the same day. This would provide additional inventory reductions and a better JIT implementation.
GLOVIA Kanban

The primary applications that Kanban interfaces with in the GLOVIA system are Master Production Scheduling/Material Requirements Planning (MPS & MRP), Repetitive Scheduling (RP) and Customer Releasing (CR). Other applications such as engineering and inventory are of course also integrated but provide functions that are more supportive of the applications where the primary planning activity occurs.

The planning process would begin with demands being calculated based on release information being generated in the customer releasing application. CR would also create a demand for the containers that are associated with the item. The demands would be used to drive the planning activity in MPS and MRP.

MPS and MRP would use the workday calendar to determine the number of kanban cards required to produce the quantity of items that are in the schedule. This number would be based on the quantity of the item that fits in a standard container. Normal MPS and MRP netting logic would then be applied. The system would generate both move and production kanban cards as a result of this planning activity. The kanban cards would then be used to drive the production and material movements that are required to support the original demands developed in CR.

Execution of the schedule would be reported through repetitive scheduling. Since the kanban cards are being used to drive the actual production activity the RP function is used differently than when kanban logic is not applied. In this application of RP the primary function is to report completions, process backflushing logic and collect costing information. Reporting completions and backflushing would also provide the correct data to update inventory quantities.

When an item is completed and moved into inventory CR is used to process pick pack and ship functions. Material will then be sent to the customer for whom the original demand was created.
JIT planning is supported through logic that calculates the requirements for material on a daily basis and then applies kanban planning information to determine the number of kanban cards required to meet the schedule. This calculation determines the amount of an item that must be produced each day to meet the plan generated in MPS and MRP and the number of kanban cards required to support the production schedule. The user will have the opportunity to move toward JIT targets by establishing the number of material moves per day, the quantity of material in a move container and the number of safety stock days, if any are included in the plan.

As completions are reported for repetitive schedules, backflushing will be used to reduce the inventory of components at the work center at which the manufacturing took place. When item containers are emptied, the move kanban card will be used to move additional material to the work center. This will eliminate having to use issue transactions for these material movements. Material is placed into the container that has been emptied and the kanban is scanned to report the material movement from a stores location to a WIP work center.

The kanban and schedule can both be converted into barcode information. This will allow scanning to be performed that will update schedules and inventories. The item that has been scheduled will be moved to stores as a result of the schedule completion, where the material will now be available to send to customers.
The shipment cycle can then be applied to the completed items. The activities can include committing material, creating the packlist and then printing the container labels. The packlist can then be confirmed and the shipment recorded. Load planning information is also available if the user needs that function. Packlist and Bill of Lading information will be available as part of the documentation generated by the shipment of goods.

In addition to the functions previously mentioned EDI transactions are available to support the shipping activity. There is the option of providing Advanced Shipment Notices to customers if they are required.

**Kanban Benefits**

Using Kanban functionality will provide the following benefits:

- Reduced transaction activity
- Improved schedule execution
- Improved JIT performance
- Integration of Kanban and bar codes
- Integration of shipping and EDI transactions
- Smaller batches will result in improved visibility of activity on the shop floor
- Reduced inventory levels and improved schedule performance
Glossary of Terms

**CR** - Customer Releasing, a method of controlling customer demands and shipping material to meet those demands.

**EDI** - Electronic Data Interface, using electronic transactions to provide a communication tool with customers.

**ERP** - Enterprise Resource Planning, today’s definition of an integrated manufacturing management software suite.

**JIT** - Just in Time, a manufacturing approach that attempts to have inventory available as close as possible to its actual required time.

**Kanban** - Bill board sign, signal or card.

**MPS** - Master Production Scheduling, the high level plan for production (typically applies to end products or critical items).

**MRP** - Material Requirements Planning, traditional approach to manufacturing planning consisting of gross requirements determination, netting of available inventory, order planning (lot sizing), and setting of required start date for material acquisition.

**RP** - Repetitive Manufacturing, a method of manufacturing that allows the user to build to repetitive schedules rather than work orders.

**WIP** - Work in Process, inventory that is on the shop floor.
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