SyteLine®

Hybrid Manufacturing Methods

The following manufacturing execution and costing methods are supported in SyteLine. These methods can be combined in a single environment so that the optimal method is used for each manufactured item allowing you to minimize the costs of managing production.

Work Orders

Best for Make-to-Order, Configure-to-Order, Assemble-to-Order, Engineer-to-Order

Work Orders (jobs) allow communication of a specific BOM, routing, and instructions to the shop floor and precise costing. However, work orders require more paperwork and transaction entry than the "lean" methods of Production Schedules and JIT\Kanban. A work order is a mechanism to launch and monitor production to meet a requirement. It is very flexible and easily changed to meet a specific customer's requirements and provides great detail in cost tracking and analysis. It is also a way to cross-reference production activities to a specific customer order, allowing status tracking by drilling down from the customer order. Work orders have their own bill-of-material and routing structure and are individually released to manufacturing. SyteLine provides several methods of creating and defining a work order, including:

- Enter work order into SyteLine manually
- Copy an existing work order, standard BOM, or quote\estimate
- Firm an MRP\APS planned order
- Create by launching a sub-job to build a subassembly for a parent work order
- Create by launching a work order from a sales order (standard or configured item)

SyteLine allows manual issue of materials to a work order or backflush of materials automatically based on operation or work order completions. SyteLine work orders track actual labor, material, and overhead and allow comparison to planned, estimated, and standard costs. WIP (work-in-process) costs are accumulated in the work order and relieved when items are completed against the work order.

Work order transactions for materials, labor, and machine time can be entered manually, or posted automatically with Bar Code Data Collection or backflushing. SyteLine maintains the current status of a work order. A work order status inquiry or report helps you locate and identify the status of a particular work order or group of work orders to determine estimated completion date, material shortages, operations not yet completed, accumulated costs, cost to complete, and detailed costing analysis.

Production Schedules (Work order-less production)
Best for Make-to-Stock Finished Goods and Components, or High Volume To-Order

Production Schedules eliminate the tedious work of creating and tracking work orders and recording individual work order transactions. Production Schedules are typically used for items you manufacture regularly (standard products) and do not need precise tracking of actual labor and material costs for every work order. Scheduling and tracking production is based on quantity targets for a work center, rather than creating a work order for every item quantity to be produced. Rather than being required to report all activity to a specific work order, SyteLine Production Schedules allow materials, activities and their costs to be charged to work centers.

In addition to significantly reducing transaction recording time, production schedules allow manufacturers to be more spontaneous in authorizing production. This type of production is typically rate-based, meaning the goal is to produce a quantity of items at a particular rate of production. While this type of manufacturing control does not provide the same level of control and detailed costing as work orders, manufacturers generally find that production schedules offer the following benefits:
-   More flexibility in making schedule changes
-   Reduced effort in establishing and maintaining production plans
-   Reduced paperwork and system transactions

SyteLine production schedules do not require actual labor and material tracking. Instead, after a production schedule is created (either manually or by firming MRP\APS plans), you need only record the item produced and the quantity. SyteLine can backflush labor, materials and overhead based on the current bill-of-material and routing. Or you can manually report labor, materials and overhead to the appropriate work center and costs are charged to the items produced in the work center based on the standard bill-of-material and routing.

JIT or KANBAN
Best for Lean Manufacturing when inventory replenishment is triggered by Re-order points or visual signals.

To support "demand flow" or "pull" manufacturing environments, SyteLine provides Just-In-Time/KANBAN production reporting, which requires the minimum amount of manual planning and data entry. This method is similar to Production Schedules, however, there is no required advanced material and capacity planning in the ERP system, which is instead accomplished through re-order points, Kanban signals, or vendor managed inventory.

Production or purchasing is triggered when an item is needed; the requirement to make it is "pulled" from a production point ahead in the production process. The only transaction recording SyteLine requires is how many of what item was produced, which can be accomplished real time or at the end of the shift. JIT/KANBAN works very well for dynamic manufacturing environments where product mix is highly variable and must react quickly to changing demands, since it only requires reporting what was produced, and does not require changing the production plans in the ERP system.

JIT/KANBAN does not require as much data entry as work orders and production schedules, and no pre-authorization is needed to record production. JIT/KANBAN allows you to report the item and quantity, then SyteLine immediately backflushes per the standard bill-of-material and routing. Actual labor, machine hours and materials are charged to work centers and variances are recorded on a period basis, rather than by individual work orders. With this flexibility, SyteLine makes it fast and easy to record production activities, thereby minimizing non-value-adding activities on the shop floor.

SyteLine's optional PullSystem, adds to this JIT/KANBAN functionality with automatic calculation of the optimum re-order point and max inventory level using both historical averages and forecasted demands. It statistically calculates safety stock with user defined service-level policies considering variability of demand during lead-time. It uses the Kanban Reorder Point to automatically trigger replenishment work orders, production schedules, dynamic dispatch lists, or purchase orders considering supplier or manufacturing lead times. The PullSystem recommends which inventory items are best managed by Kanban replenishment method (vs. MRP) based on historical usage patterns. See the PullSystem data sheet for more information on how it helps implement a lean production and inventory replenishment system.

Project Manufacturing
Best for Multi-phase, Time-line and Budget Managed, Interrelated Activities

For more complex manufacturing, project manufacturing allows creating projects that group work orders that are being processed over a period of time. The projects allow for user-defined cost categories, work break down structures, flexible cost and profit recognition methods, flexible billing methods and reporting across multiple manufacturing activities over varying time periods. The timeframe and tasks of the projects can be more finitely tracked, budgets and estimated completion costs better controlled, and the integration with Microsoft Project provides extensive project graphing and management abilities.   Projects are also good at managing and costing non-manufacturing projects such as R&D projects, marketing projects, product roll-out, and construction.

Refurbish and Repair
Best for Service Based Production

SyteLine's optional service management system, FS Plus provides for efficient scheduling, controlling and costing of in-house or field service refurbish and repair work. Service Orders are created to budget and track the work and flexible billing methods are supported such as cost plus, fixed price and time and materials.   Service orders are typically tied to a specific unit, or serial tracked item so as to allow for keeping a service history on the item, tracking warranty work, and keeping an as-built vs. as-is configurations of the serviced units. Many other service management functions are provided by FS Plus, please refer to the FS Plus data sheet for more details.

Hybrid Planning Methods

Any combination of the above methods can be used to execute, control and cost the production and purchasing plans generated by SyteLine. The "plans" can be generated by the below methods which can be combined in a single environment to allow the most efficient method to be used for each item. The "manufacturing method" determines "How" production is managed… the "planning method" determines "what" to make or buy and "when" to do it, which drives production and inventory replenishment. Any manufacturing method can be used to execute and control the "plans" of any planning method. For example, Advanced MRP can be used to create all the plans and Production Schedules can be used to make some items, Work Orders used for others, and for others the plans can be a simple "suggested work center dispatch list", that is dynamically regenerated based on actual needs. The following three types of planning methods are offered:

Advanced MRP
Best for Assembly with some Fabrication and flexible resources

Advanced MRP is the next evolution of the MRP (Material Requirements Planning) or MRP2 (Manufacturing Resource Planning) offered by most ERP systems. It plans using standard manufacturing lead times, but allows for finite scheduling and dispatching. MRP\MRP2 are batch systems highly dependant upon Forecast accuracy, large lot sizes, and expediting. Advanced MRP offers real time available-to-promise (ATP) due date calculation and real time allocation of inventory and resources. This provides accurate customer due dates and eliminates the possibility of over reserving inventory and capacity. Advanced MRP "plans" order by order, through all levels of an order (unlike MRP\MRP which plans level by level in batch). It plans to meet the customer request date, but plans forward from today if a constraint is encountered… eliminating the "past due requirements" generated by MRP\MRP2 logic. It also, automatically adjusts plans to meet customer requested dates when materials or capacity becomes available.

Advanced Planning & Scheduling (APS Option)
Best for Fabrication and Assembly with significant capacity constraints.

APS uses the Advanced MRP engine and adds Finite planning which synchronizes the Finite schedule with the material plan. It plans using actual manufacturing lead times based on the current load on the shop and availability of materials. APS offers real time capable-to-promise due date calculation (considering both material availability and actual available capacity) and real time allocation of inventory and resources. This "synchronization" of materials and capacity allows for more realistic schedules in capacity constrained environments where shifting of resources is inflexible.

Pull Replenishment (Kanban, Lean, Demand Flow, TPS) **(SyteLean Option)**
Best for high volume, small lots, reduced paperwork

This planning method drives inventory replenishment based on statistically calculated optimum inventory levels and lot sizes. Reorder\trigger points, number of Kanbans, Kanban quantities, and maximum inventory are statistically calculated considering a weighting of actual usage and forecasted demand. Pull replenishment automatically adjusts to production mix and volume requirements and generates "electronic Kanbans" that can be firmed into Work Orders or Production Schedules, or directly executed via electronic cell or work-center dispatch\Kanban lists.   Analysis reports are provided that assist in determining which items are best planned with pull replenishment versus MRP\APS.