



The **Priority** Enterprise Management System

Production Control

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Introduction

Priority's Production Control module provides the means for handling production from the maintenance of work orders, through the issue of materials to the floor (including issues to kits), to the reporting of finished jobs and the maintenance of plant-floor inventory (work in progress).

The module can be used in conjunction with or independently of production planning and/or material requirements planning (MRP). When used separately, work orders and issues are prepared manually. Nonetheless, kit lists will be opened automatically for these work orders, and issues to kits will take into account the appropriate warehouse and lot of the material in question. Moreover, the system will display the balance of available inventory of this material in this warehouse and lot.

A common production dilemma is: "Which work orders can be or need to be worked on in each work cell during the upcoming shift?" — a problem that most MRP packages are unable to handle. **Priority's** production planning program provides the answer. It generates a work plan displaying precisely those work orders that can (and ought to) be executed, taking into account production priorities and the availability of required materials for each operation.

The detailed results provided by **Priority's Production Planning** module are transferred to the **Production Control** module, enabling you to compare planned and actual production.

Work Orders

Work orders are automatically opened by the system either by production planning or material requirements planning (MRP). You can revise results as well as open work orders manually.

Each work order is assigned a unique number based on the template defined for the part (note that you can maintain work order numbers for certain parts and not for others). Production is then reported per work order, so that processed quantities are attached to the work order number. It is thereby possible to maintain warehouse balances separately for each work order. Specifically, it is possible to save information such as: production date, expiration date, the bill of materials revision used in its production, and the like.

When opening a work order, the routing defined for the part to be produced is recorded automatically. You can revise the routing for a particular work order, if the desired routing is different from the standard. Production reports as well as the **Backflush** utility will take the special routing into account.

Priority enables you to glean various types of information regarding work orders:

- The sales order(s) for which this work order was opened (if opened automatically).
- The components (raw materials and sub-assemblies) required to create the part in a given work order. One report displays the work cells from which needed components can be obtained (planned receipts); another specifies all work cells to which the components processed in the current work cell need to be transferred (planned issues).

- The list of kit components required by the work order, balances yet to be issued, and missing components.
- The status of a work order. Work order status is updated automatically at each of the following stages:
 - When it is opened (manually or automatically)
 - When it is released
 - When reporting its first and last operation
 - When it is printed
 - When it is closed.

You can also use the status to freeze a work order.

- The planned progress of the work order (based on production planning results).
- Jobs that have been completed for the work order based on reports of production for the steps in the routing.
- Work orders that are “stuck” in the midst of their processing (i.e., there are no recent reports of job production for them).
- WIP (work in progress) inventory attached to a closed work order.

A printout of the work order displays such details as the required quantity of the part, production time, production steps (in order of execution), the work cell in which each is to be carried out, engineering data for each step (blueprints, required tools), and the expected time of completion.

Issues to the Plant Floor

Plant-floor inventory transactions mainly refer to various types of issues to the floor. These are primarily distinguished from one another by the degree of tracing (which child parts are issued to which parents). Issues to the plant floor can be made according to an issues plan, as an issue to a kit, as a manual issue or as an issue of supplies. Items for which vendor lot numbers or work order numbers are maintained are issued in accordance with expiration dates and by the FIFO (first in, first out) method.

Issues Plan

The issues plan determines what materials are needed on the plant floor, in what quantities and on what date. The plan is generated by the results of production planning or material requirements planning (MRP).

Issues to Floor Stock

Issues to floor stock entail the periodic issue of materials in bulk to the plant floor for use in production. These materials are available for use in any work order, and their usage is calculated automatically (by the **Backflush**) based on production reports for their parents, taking into account parent-child ratios in the bill of materials.

Issues to Kits

Issues to kits are issues of materials and/or sub-assemblies that are targeted for a specific work order. They are generally recorded for relatively expensive components (like electronic parts) or when the job is sent to a subcontractor.

A kit list is a list of all the child parts required by a processed part in a work order. The list includes the required quantity of components in the kit (based on parent-child ratios in the bill of materials), as well as the production step at which each component is issued to the parent part.

Issues to kits are created for each work order once it has been released. They may be revised manually, enabling you to create a specific bill of materials for an individual work order. The children and quantities appearing in the kit list will then be taken into account by the **Backflush** utility in the calculation of floor inventory.

Manual Issues

In some cases, a particular work order requires less than the quantity of items that comes in the standard package for this part, and the fragility of the part precludes removing it from the package until needed. In such a circumstance, you can issue the material to floor stock manually, and then report a manual issue to the work order (designating exact quantities, as well as the specific child lot). This prevents all the goods that are in the standard package from “disappearing” from the balance in the warehouse. This is important when dealing with items that are too expensive to issue to stock and which are supplied in packaging that should not be opened until actual use requires specific quantities per work order.

The **Backflush** facility does not perform automatic calculations for manual issues, but rather takes into account the details that are manually specified.

Issues of Supplies

Supplies are raw materials that are not included in any bill of materials, but rather are consumed during the production process or other peripheral activities of the business (e.g., lubricating oil, rubber gloves, lavatory soap and the like). The warehouse balance of the consumed parts is reduced once the supplies are issued.

Backflush (Maintenance of WIP)

The **Backflush** program adds or subtracts quantities on the basis of production reports for specific jobs. Taking into account the bill of materials and routing of the part undergoing processing, the **Backflush** adds to the inventory of the reported job and subtracts from the inventory of any child jobs. This allows, among other things, for the management of work in progress.

The **Backflush** facility is able to calculate inventory levels for all processing steps, even those for which there is no reported production, so long as production is reported for a later stage in the manufacturing process.

The **Backflush** maintains WIP at a subcontractor's warehouse just as it does for your own plant floor, taking into account the documentation of shipments to and receipts from the subcontractor.

The **Backflush** creates automatic inventory transactions in keeping with the progress of production and the demand for child parts at each step. For example, when production is reported for an interim stage in processing, only those materials that are needed for this particular production step are deducted from inventory. That is, child parts that are joined to the parent in later stages of production are not yet deducted and continue to appear as inventory on the plant floor. Moreover, the inventory of the parent part at that particular production step is increased (with the last operation appearing in the warehouse balance).

Following activation of the **Backflush** program, the system warns of any negative balances calculated for plant-floor inventory. This is generally an indication of inaccurate or missing reports of production.

Online Backflush

You can set up the system to run the **Backflush** automatically, in a localized manner. This provides you with a highly accurate, while not comprehensive, picture of the current floor inventory without tying up the resources required to run the full program. The online program adjusts floor inventory balances on the basis of the following events:

- Raw materials entering or leaving the plant floor (e.g., via warehouse transfer)
- Automatic transfer of completed parts from the plant floor upon execution of their final operation
- Production reports.

When the full **Backflush** is subsequently run, it confirms or adjusts these online calculations.

Tracking Production

The progress of production is recorded and tracked by means of reports of jobs processed on your plant floor. In addition, **Priority** has a special mechanism to keep track of components sent to subcontractors, as well as processed parts or assemblies received from them.

Reports of Production

The main objective of reporting production is to provide an accurate picture of plant-floor operation. Reporting enables **Priority** to keep track of floor inventory and the progress or completion of work orders, which are taken into account in the next cycle of production planning. It also allows for tracing of rework on a completed work order or a portion of it. Finally, reported production affects cost analysis.

Production reports are recorded per job. Generally, production is reported with respect to the completion of jobs for a work order carried out in a given work cell. During factory modeling, you can designate, per production step, whether or not reporting is required for the purposes of inventory control and/or costing.

During production reporting for any given job, you can specify the lot number of issued materials or the work order number of an issued sub-assembly. This allows for full traceability of the work order's components.

Each report of production details the results of the operation being reported and can include the following information:

- Quantities processed
- Quantities scrapped
- Quantities with MRB status
- Processing time (affects machinery costs)
- Labor time and the number of any employee (skilled or unskilled) who performed the job (affects labor costs)
- Usage of tool (affects next cycle of production planning)
- Rework (affects rework costs)
- Set-ups (affects next cycle of production planning and set-up costs)
- Work breaks
- The warehouse and bin into which the part was transferred upon completion of this operation (if a default warehouse and bin have been designated for the production step being reported, usually true of the last operation in the routing)
- The shift in which the job was carried out (affects labor costs)
- The work order or lot numbers of components manually issued for the purpose of traceability
- Serial numbers of processed parts and of their component parts.

Priority's Production Control module can be linked to external plant-floor data collection systems (a separately priced option).

Subcontracting

Subcontractors are managed in the system as a sub-group of vendors. This allows for the purchasing, billing and payment processes to be managed within regular vendor transactions, alongside the production process. Specifically, inventory currently held by the subcontractor can be considered and managed as work in progress.

A vendor who is a subcontractor is unique in that a plant-floor warehouse has been designated for him/her. The system identifies purchase orders and receipts of goods (or rework) from subcontractors and relates to their costs as subcontracting costs. In addition, components and partially processed parts sent to the subcontractor's warehouse are managed as work in progress, and, more importantly, are deducted from the subcontractor's inventory once the receipt of processed goods is documented.

You can create a kit warehouse for a subcontractor. This is an area used to prepare shipments of kits to the subcontractor in accordance with the work orders scheduled to be processed. As it is prepared, inventory is moved into the kit warehouse and, once all component parts are available, the entire kit is shipped to the subcontractor's warehouse.

You can also custom-design a bill of materials for each subcontractor. For instance, you can make assemblies in the original BOM into phantom parts and disregard raw materials that do not need to be issued (because they are purchased independently by the

subcontractor). This customized bill of materials is taken into account in the creation of kit lists, as well as by MRP, production planning and the **Backflush** facility.

Both production planning and material requirements planning relate to the subcontractor's work cell just like any other and execute planning accordingly.

Subcontractors are incorporated into the production process as follows:

1. One of the planning programs — material requirements planning (MRP) or production planning — is run.
2. Purchase planning is run.
3. Any components that need to be sent to the subcontractor are obtained (i.e., ordered or manufactured).
4. Work orders are opened manually (if not automatically) and released.
5. Kit components are issued to the subcontractor's kit warehouse in preparation for shipment.
6. A purchase order is opened and sent to the subcontractor based on purchase requisitions generated by purchase planning.
7. The parts required by the work order (kit components and other parts) are sent to the subcontractor. A shipping document is created and printed to accompany the shipment.
8. The receipt of processed parts from the subcontractor is recorded upon its arrival. The receipt is linked to the work order for which the purchase order was made, and the components that were sent to the subcontractor are reduced from inventory in the subcontractor's warehouse.
9. The cost of the work performed by the subcontractor, as well as the cost of the components sent, are added to the cost of the work order when cost analysis is run.