QAD Enterprise Applications
Enterprise Edition

User Guide

QAD Planning and Scheduling Workbenches

Overview
Master Scheduling Workbench (MSW)
Production Scheduling Workbench (PSW)
Component Availability Check (CAC)
Co-/By-Products
Enterprise Asset Management
Troubleshooting, Tips, and Errors

70-3173-2013EE
QAD Planning and Scheduling Workbenches version 2013EE
QAD Enterprise Edition
March 2013

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QAD Inc.
100 Innovation Place
Santa Barbara, California 93108
Phone (805) 566-6000
http://www.qad.com

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Change Summary

The following table summarizes significant differences between this document and previous versions.

Date/Version	Description	Reference
March 2013 EE	Rebranded for March 2013 EE.	--
	Added new create process performance topic.	page 17
December 2012.1 EE Enhancement/Maintenance Release	Added a new quick-find function that lets you locate items and production order records on the MSW.	page 21
	Added new functionality that makes forecast dynamically included in Supply/Demand Panel.	page 26
	Added new Seasonal Build, Change Quantity by Month, Holidays, and Intersite Demand browses for the workbenches.	page 64
	Added new CAC on-demand, dynamic processing for the MSW.	page 91
May 2010.1 through 2012 EE enhancement bundle	Added new co-/by-product chapter to the book.	page 95
	Added new section for deleting/closing scheduled orders to MSW chapter.	page 49
	Added new fields for CAC user preferences	page 83
	Added new problem/solution information for closing E status co-/by-product orders to Troubleshooting appendix.	page 112
March 2012 EE Retrofit	Added a section to the Overview for Enterprise Asset Management (EAM) future functionality.	page 7
	Added sentence regarding notification of background thread completion to Overview chapter.	page 15
	Added a section to the MSW chapter to describe a the Product Structure Filter that helps schedulers gauge the impact of a schedule the change immediately across for all levels of the bill of material (BOM).	page 43
	Restructured the Overview in the component availability check (CAC) chapter to better reflect workbench built-in CAC functionality	page 89
	Added subsection to MSW chapter for functionality to change a firm order back to a planned order.	page 52
September 2011/2011.1 EE	Rebranded for QAD 2011.1 EE	--

Chapter 1

Overview

The QAD Planning and Scheduling Workbenches—which include both a Master Scheduling Workbench (MSW) and a Production Scheduling Workbench (PSW) with integrated component checking capabilities (CAC)—provide planners and schedulers with unprecedented, simultaneous visibility to schedules and all supporting data and enable control and collaboration across the production and materials planning space.

The following topics introduce the MSW, PSW, and CAC and discuss basic features, functions, and options available to both workbenches.

Introduction 2
Introduces the components and features of the Planning and Scheduling Workbenches.

Common Workbench Elements 4
Describes the elements of both the MSW and PSW and tells you the capabilities and purpose of each element.

Synchronizing MSW and PSW Data 9
Describes the way to use the MSW and PSW simultaneously to build schedules.

Common Features 9
Describes features and components that are common to both the MSW and PSW.

Limitations 15
Describes areas not covered by MSW or PSW.

Performance 15
Describes performance considerations and tips to improve performance.

Introduction

Successful scheduling deals with analysis, review, and manipulation of all data that impacts production machines, work centers, production orders, production lines, and other related resources of the manufacturing process. It also requires complex calculations that are immediately applied to manipulated schedules or any supporting data. More importantly, it requires immediate display of calculation results, especially when scheduling issues arise.

Previously, you needed numerous QAD Enterprise Edition (EE) menus to effectively view or manipulate schedule data, which could be time consuming and cumbersome. Now, new scheduling tools are provided through the.NET UI that let you effectively plan and schedule resources for a master schedule or a production schedule from a single workbench for each type of schedule.

You can select the Planning and Scheduling Workbenches from the .NET UI's list of applications. When you do, you have access to:

- Master Scheduling Workbench (MSW)
- Production Scheduling Workbench (PSW)
- Component Shortage Report
- Integrated Component Availability Check (CAC)

Initially, building a master schedule, then a subsequent production schedule, was done in a step-wise manner using several reports and maintenance screens, which was a cumbersome process. Now, you can concurrently plan and schedule production in a single process/toolset.

Schedules built through MSW or PSW let you build schedules that assist in doing the right production order in the correct order and consumes less time for you when building them.

Providing tools to build schedules is not enough, though, if you cannot monitor and manage component shortages. For that reason, several shortage-monitoring features are also available when you are building effective schedules.

Master Scheduling Workbench (MSW)

The MSW is a .NET UI application that increases master scheduling efficiency by displaying and manipulating system demand, supply, scheduling, inventory, production order, advanced repetitive, and MRP data from several QAD EE programs into a single workbench.

Note *Production order* is a new term to replace the term work order. It represents both repetitive and discrete orders.

You can use the MSW to interact with production lines, machines, and production order schedules and make changes where necessary.

Within MSW, you can update the production order status—planned, firmed, allocated, released, closed—as well as create production orders, while considering all demand and supply sources, from this single workbench. You can ensure that items with similar attributes are scheduled together while also ensuring that there is enough capacity to take advantage of running similar items. You can also identify items with demand that have no released production orders or check component availability for each production order to be released.

User-configurable parameters control the number of days you can directly manage a scheduling period, as well as the future and historical periods available for schedule review.

Event-based color coding lets you easily identify areas of concern. You can review and manipulate schedule and production order data in a simulation mode, then save the updated information back to QAD EE as repetitive/discrete production schedules/orders.

Production Scheduling Workbench (PSW)

After you generate a master production schedule over a monthly, weekly, or daily horizon, you may need to refine the master schedule by creating a production schedule for a shorter two-to-five day period for the shop floor to use. Production scheduling entails:

- Sequencing jobs by key attributes/constraints within a day or shift to obtain maximum operational efficiencies
- Verifying that materials are available before releasing the schedule/orders to the shop floor
- Releasing and authorizing production orders

Some companies run a single production order over several days, while others run multiple production orders within a single day. Further, some companies define a production sequence by shift to monitor shift performance or ensure that products are available for a specific shipment time.

The PSW lets you schedule discrete and repetitive items on production lines. You can schedule items within a day and shift (sequencing). You can use the PSW to view and update production line schedules used with the QAD Advanced Repetitive module. You can also use the PSW to view and update production orders used with the QAD Work Order module.

Production Order Browse

In the Sequence Grid, you can use Production Order Browse, a separate panel, to create dynamic queries. You can find those production orders that pertain to your scheduling issues. You can configure your view or group data within Production Order Browse.

Production Order Browse only displays firm and active production orders. Discrete production orders are active until the order status is [C]losed. Firm orders are any order status greater than [P]lanned. Repetitive Production Orders are active when quantity open is greater than zero.

Component Availability Check (CAC)

Component Availability Check is another component of the Planning and Scheduling Workbenches and is integrated into both the MSW and PSW workbenches. This lets you verify that materials are available before you release orders and print the orders and schedules. Integrated CAC serves two distinct purposes:

- Schedulers and planners use CAC features to ensure that the jobs they schedule days in advance to production have enough materials.
- Schedulers and planners use CAC features to ensure that the jobs they release to the shop floor have enough materials.

The CAC engine is also leveraged in several user-based collections developed specifically to be leveraged with the Planning and Scheduling Workbenches

All users can use CAC supporting data to analyze component availability. Within the planning and scheduling workbenches, built-in panels at the bottom of the workbench provide supporting data. For more information on the Component Check browse collections, see “Component Availability Check (CAC)” on page 89.

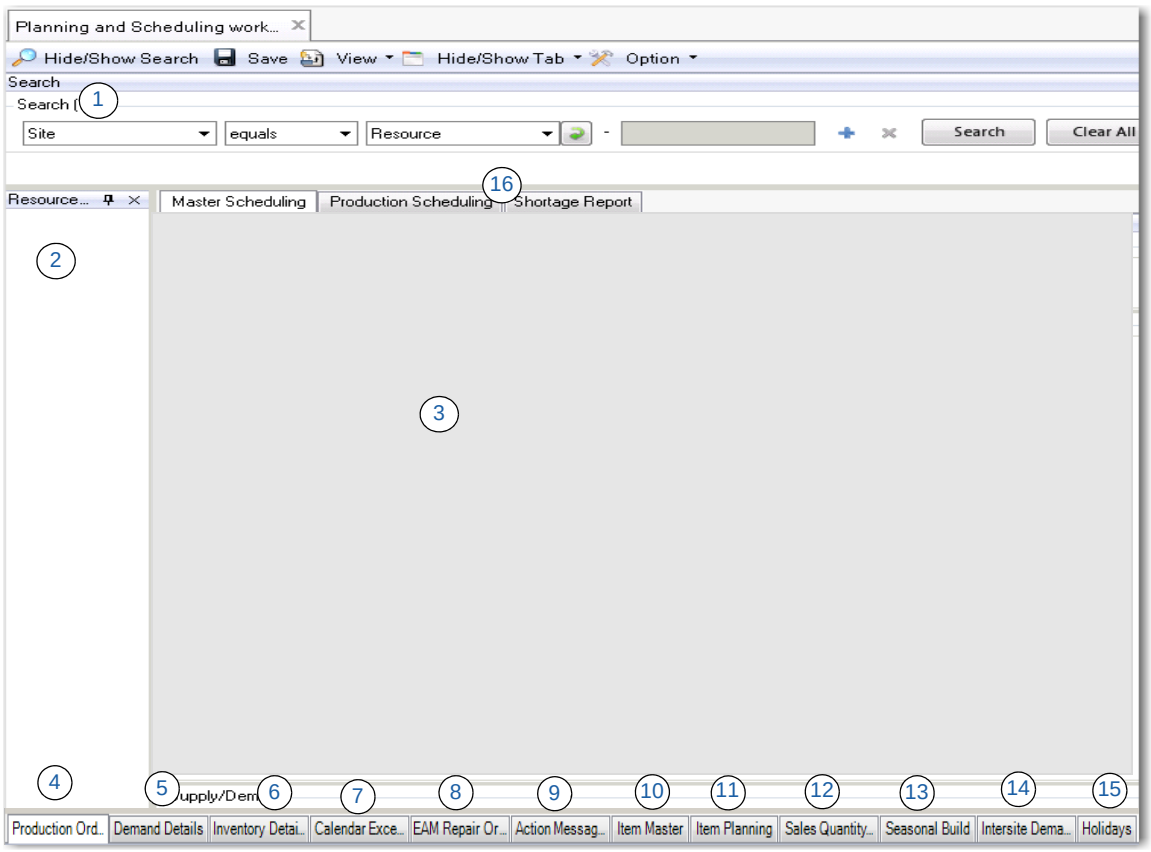
Common Workbench Elements

You can interactively control the workbench behavior and content, such as the panels that display, data filters, and business rules. You can save your customized workbenches layout as a View and invoke it on demand, based on the type of scheduling you are performing.

When you make selections within some panels, the system displays supporting information related to the record selected in the supporting tabs. This information is detail information; for example, demand detail records, supply detail records, item transaction history, item inventory details, bill of material, and routing. Also, when you make changes or create new data in some panels, data in other panels changes to reflect the new data.

The following depicts areas that are common to both MSW and PSW.

Fig. 1.1
Common Scheduling Elements



(1) Search Panel

Use this area to select resources and items to schedule.

The selection results are limited to sites that you can access, based on security records defined in Site Security Maintenance (36.3.15). Additionally, if you are in a multiple-domain environment, the system only displays sites in domains that you can access based on settings in User Maintenance (36.3.1).

(2) Resource Panel

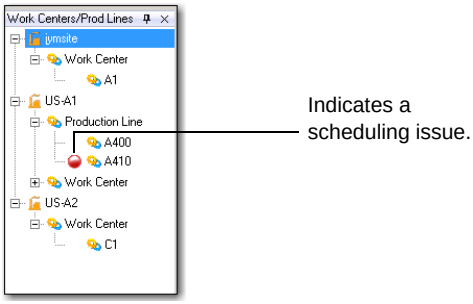
Based on your selection criteria, the Resource Panel displays the sites and resources. Resources are grouped by site and resource type. Resource types consist of two categories:

- Production lines
- Work centers

When you click on a work center/machine or production line resource in this panel, the Schedule Grid displays only those items associated with the selected resource.

The Resource Navigator Panel highlights each resource with a POH shortage icon when one or more items associated with the resource has a POH shortage within the resources's defined scheduling horizon.

Fig. 1.2
Resource Panel



(3) Schedule or Sequence Grid

This area displays the Schedule Grid in MSW or the Sequence Grid in PSW. The MSW, PSW, and Shortage Report content are controlled by the Navigator Panel.

For information on MSW, refer to "MSW Schedule Grid Data" on page 42.

For information on PSW, refer to "Working with Sequence Grid Data" on page 79.

(4) Production Order Maintenance

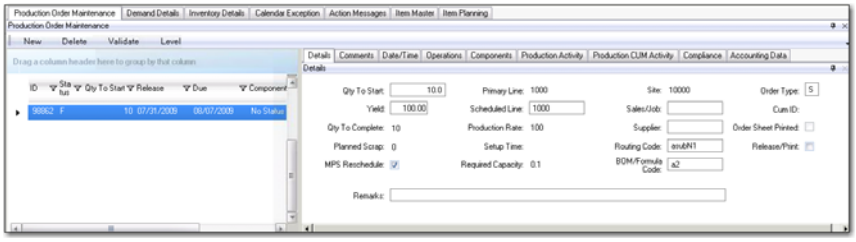
You can access Production Order Maintenance within the workbenches. Production Order Maintenance lets you view individual item production order supply records for items that display in the MSW Schedule Grid or PSW Sequence Grid. Production Order Maintenance uses a horizontal layout and supports scheduling of work centers, production orders, and production lines. You can view, monitor, and interact with details of a production order within the Production Order Maintenance tab.

The left side of Production Order Maintenance displays production order summaries with the order ID, status, quantity ordered, and release date columns. The right side displays production order details, comments, date/time, operations, order relationships, component availability data, production activity, production CUM activity, compliance data, and accounting data for the order.

Using these tabs, you can view several aspects of data that have an impact on the production order and alter data without leaving MSW/PSW. Production Order Maintenance also lets you to create a new order, delete an order, or validate an order. When you validate the order, the system checks for correct data in production order fields and when errors occur, it indicates which fields require that you correct data.

After you complete production order updates, you can save changes globally by clicking the workbench toolbar Save button. Some validations take place in real time when you modify the order on the workbench; others are performed during the save process. The Validation button invokes the validations that would be performed during the save process.

Fig. 1.3
Production Order Maintenance



Production Order Maintenance auto-selects the first production order on the selected Schedule Grid due date and displays additional production orders in the past and future. Scroll up to view orders with prior due dates; scroll down to view orders with future dates.

When you select an item on the Schedule Grid with a supply/demand issue, Production Order Maintenance displays any planned orders MRP generated to resolve the supply/demand issue and existing production orders of various statuses associated with the item.

For each due date, production orders display by status in this order: P(lanned), F(irm planned), A(llocated), E(ploded), R(eleased), C(losed). Then, for each status, they display by production order ID.

If you select a different production order in Production Order Maintenance, the Schedule Grid does not change.

(5) Demand Details

When you select an item in one of the daily schedule fields, the system displays information about the components of the demand, such as sales order/line numbers and quantities or seasonal demand under the Demand Details tab. This display is based on MRP detail records.

Special behavior of the MSW Schedule Grid is as follows:

- When you select a specific day on the Schedule Grid, the Demand Details frame displays all demand records with due dates equal to the selected Schedule Grid date column.

- For the item/day selected on the MSW Schedule Grid, the Demand Detail Frame focuses on demand records, starting with the demand records with due dates equal to the selected item/day. If no matches are found, the frame focuses on the first demand record found—the oldest record. You can scroll to see all open demand records in the past or records in the future.

(6) Inventory Details

The Inventory Details Panel displays the item number, site, quantity on hand, inventory master data, location, lot/serial, status, expiration date, and the date created. For all areas, you can choose to display details for all, custom, blanks, or so on.

(7) Calendar Exception

Occasionally, exceptions such as overtime or machine downtime cause changes in productivity and capacity for various shifts. When you set up calendars in Calendar Maintenance, you specify a reference, such as downtime, and the number of hours per day affected. This information displays in the Calendar Exception Maintenance grid within MSW/PSW. Negative numbers can display for downtime or holidays. Holidays are days when no production is scheduled. Holidays differ from site to site.

Note You can only create Calendar Exceptions for production lines within the workbench. For the March 2011 release, when you enter calendar exception records, the system multiplies by x number of resources; for example, when you enter -3 hours and have three production lines, the system calculates this as -9 hours.

(8) Enterprise Asset Management (EAM) Repair Orders

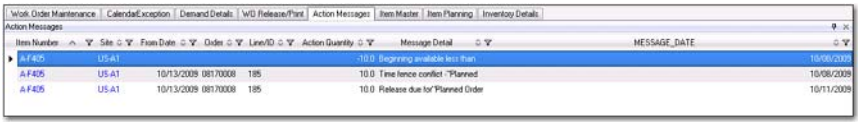
This tab is for future functionality that lets you view EAM, version 12. 5 or higher, orders for a resource within the workbenches. The EAM Repair Order Tab will provide EAM work order data similar to that of production orders.

(9) Action Messages

The Action Messages Panel displays information regarding the item issues generated by the legacy MRP action message logic. The MSW visual alerts depict negative projected on hand and below safety stocks, but the Action Messages Panel can display additional information, such as canceled production orders.

Note For error messages and conditions, refer to Appendix Aon page 129.

Fig. 1.4
Action Messages



(10) Item Master

The Item Master Panel is a browse that displays critical item information leveraged for planning/scheduling purposes and the active field values. The panel lets you view and manage items on multiple resources at once.

Note You can modify the browse view in Browse Maintenance to include information from any field in Item Master Maintenance (1.4.1).

For field descriptions, see “Item Specific Information” on page 64.

(11) Item Planning

The Item Planning Panel displays item master/planning details for a selected item. At any point during the planning or scheduling process, you can refer to the item planning panel to find information to identify lead time, order quantity, and so on. If an item-site record exists, planning data from item-site record display for the selected item-site record.

You can modify item details to include information from any field in the Item Master Maintenance.

For field descriptions, see “Item Master and Planning Tab” on page 65.

For field descriptions, see “Item Specific Information” on page 64.

(12) Sales Quantity By Month

The Sales Quantity By Month Panel lets you review or change customer consignment data. The QAD EE Customer Consignment Inventory module lets you plan, order, ship, track, and report customer-consigned inventory. The module extends the sales order process by providing transactions to ship inventory and identify it as in-transit or consigned.

For field descriptions, see “Sales Quantity By Month Tab” on page 67.

(13) Seasonal Build

The Seasonal Build Panel lets you review or change sales quantities for items that fluctuate according to some seasonal factor, such as weather or the way a firm handles its operations.

For field descriptions, see “Seasonal Build Tab” on page 68.

(14) Intersite Demand

The Intersite Demand Panel displays information for demands that emanate from distribution requirements planning (DRP) intersite requests. DRP balances supply and demand for items transferred between sites. The transfer of demand from the site receiving the items (receiving or demand site) to the site supplying the items (shipping or supply site) is facilitated through the generation of intersite requests. DRP calculates distribution item requirements, generates intersite requests, and manages shipment schedules and transportation. Use the workbenches tab to review information to schedule items for the intersite demand.

For field descriptions, see “Intersite Demand Tab” on page 68.

(15) Holidays

The Holidays Panel displays data for holidays and other non-work days that apply to an entire site. This helps you schedule effectively.

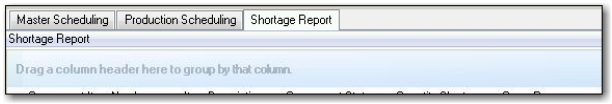
Holidays are days that no one works; the plant is shut down and no production is scheduled. Manufacturing orders are never due and operations are not scheduled on a holiday.

For field descriptions, see “Holidays Tab” on page 69.

(16) Shortage Report

Schedulers can use the Shortage Report, generated by component availability check (CAC), to monitor component shortages of manufactured/purchased parts. In the workbenches, you can see the component status at the production order level; however, the Shortage Report allows you to summarize all material shortages for all production orders that were included in your search criteria. You can run a shortage report by selecting the Shortage Report tab in the workbenches.

Fig. 1.5
Shortage Report Tab



Synchronizing MSW and PSW Data

Typically, you work with master schedules in MSW and production schedules in PSW simultaneously. The two workbenches are designed to work together and are aligned as if they were a single workbench.

For example, you select an item on the MSW Schedule Grid and verify the item supply/demand are correct. You can then determine when the item is produced in relation to other items scheduled on the same day by looking at the PSW Sequence Grid.

Or, if you are working on the PSW and move the production order release/due date back, you can then determine the impact to supply/demand by viewing the MSW demand/supply summary panel. This lets you make decisions that are based on displayed data that you can easily verify.

Note If you apply filters to the MSW/PSW, you may not see the synchronization behavior when the system does not display records per your filters.

Common Features

The following topics discuss features common to the workbenches.

Customizing Views

A number of components of the workbenches can be customized:

- Layout of grids and panels
- Repositioning/hiding tabs

- Resizing panels

This section discusses each type of customization as well as saving your view.

Saving Views

You can also save customizations as a View when you change the layout of:

- Grid column settings
- MSW Schedule Grid and Capacity Panel
- PSW Sequence Grid and Production Order Browse Panel

Repositioning/Hiding Tabs

You can move a tab on a workbench to a new location or hide a tab that you typically do not use. Repositioning/hiding the following workbench tabs can be saved as part of a view:

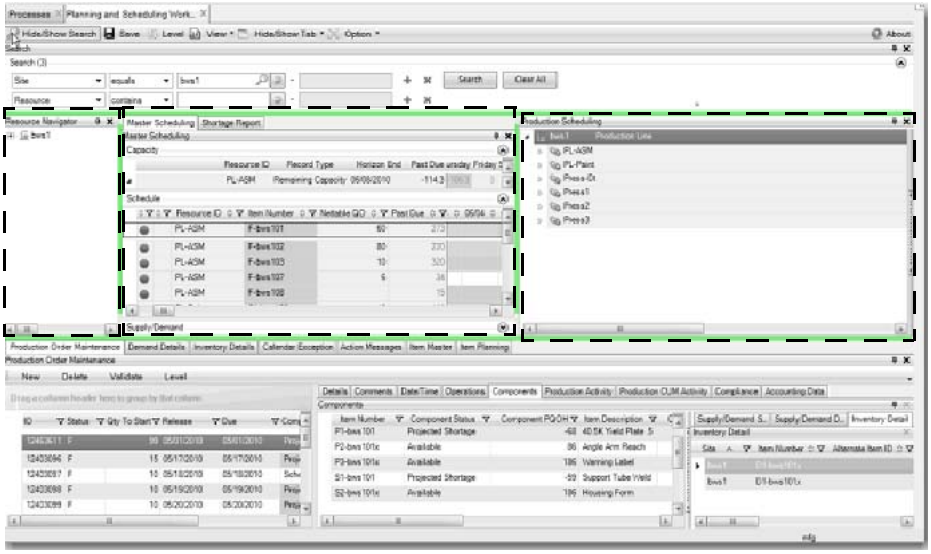
- Supporting panels
- PSW, MSW, or Shortage Report tabs

If you are working in any of the supporting programs that display at the bottom of the workbenches, and the program has multiple tabs, you can right-click on the tab, then select the Auto Hide option to display only the data in that tab. For example, when working in Production Order Maintenance, you want to focus only on the dates and times of operations for a particular order. You select the order on the left side, then select the Date/Time tab on the right side. You right click to select Auto Hide so that only the date and time data for that order displays on the right side. You can save auto-hidden areas as part of your view.

Resizing Panels

You can resize a panel to accommodate viewing by grabbing the panel’s perimeter and dragging the panel to the size that you want. You can then save your resized panels as part of your view. The following figure shows panels with dotted lines around them that can be repositioned and saved as part of the view.

Fig. 1.6
Panels to Resize



History Horizon

The history horizon defines how many days in the past you want to review completed or closed production orders. After you set the history horizon, you must perform a search to have data within the set horizon

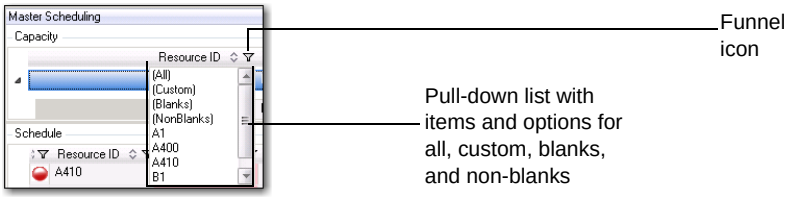
To set up the History Horizon, see:

- “Setting the MSW Schedule Horizon” on page 33
- “Defining PSW Sequencing Horizon” on page 75

Filters and Browses

In the various grids and panels, you can apply filters to the columns that display by clicking the funnel icon. Click the funnel icon to display a pull-down list with items displayed for the column along with options for (All), (Custom), (Blanks), and (NonBlanks). This is a standard .NET UI filtering mechanism.

Fig. 1.7
Filter



- To display all data, choose (All). This is the default.
- To include custom criteria, choose (Custom).
- To include only blank items, choose (Blanks).
- To display everything except blank items, choose (NonBlanks).

- For a particular item, select the item from the list.

To define a custom browse, click the funnel icon, then choose (Custom). The Enter filter criteria pop-up menu displays. By default, the menu includes an initial criteria. You can add additional criteria by selecting Add a Condition, then selecting an operation.

Displayed Records

You can filter records that the system retrieves for either the MSW or PSW. You can display records for individual production lines and work center/machine combinations.

Optionally, you can specify search operators such as equals, not equals, contains, range, starts at, greater than, less than, is null, is not null. This lets you narrow the search criteria, focusing on specific records, or broaden the search so that records for more than one site or resource, for example, displays.

When searching records to display, you can select from site, resource, resource type (production line or work center/machine), and scheduler ID from the Search pull-down menu. You can view items across a single resource or multiple resources by setting resource and search criteria.

Drag and Drop

You can easily modify aspects of a production order by dragging and dropping production orders within the PSW Sequence Grid or to the Resource Panel. You cannot drag and drop orders in the MSW Schedule Grid.

In PSW, when you drop an order onto another order, the order you drop acquires the properties of the targeted order, so, for example, if you drag and drop an unsequenced order onto a sequenced order, it becomes a sequenced order. Use the drag-and-drop method to:

- Change due dates by dragging and dropping a production order from one release date to another production order with a different release date.
- Modify resources by dragging and dropping from the source to the target destination after you select a single or multiple production orders.
- Sequence production orders in PSW by dragging and dropping single or multiple orders after a sequenced production order. After you drop the orders, the system assigns the sequence number to the order(s) as greater than the prior sequenced numbers. Shift numbers are also automatically assigned if an order is dropped on a particular shift.

  Note To sequence the first production order for a given release date/shift, you must manually enter the sequence number of (1). From this point on, you can use drag-and-drop to sequence additional orders within the same release date/shift.
- Unsequence an order by dragging a sequenced order and dropping it on an unsequenced order. The system changes the sequence to 0 (zero).

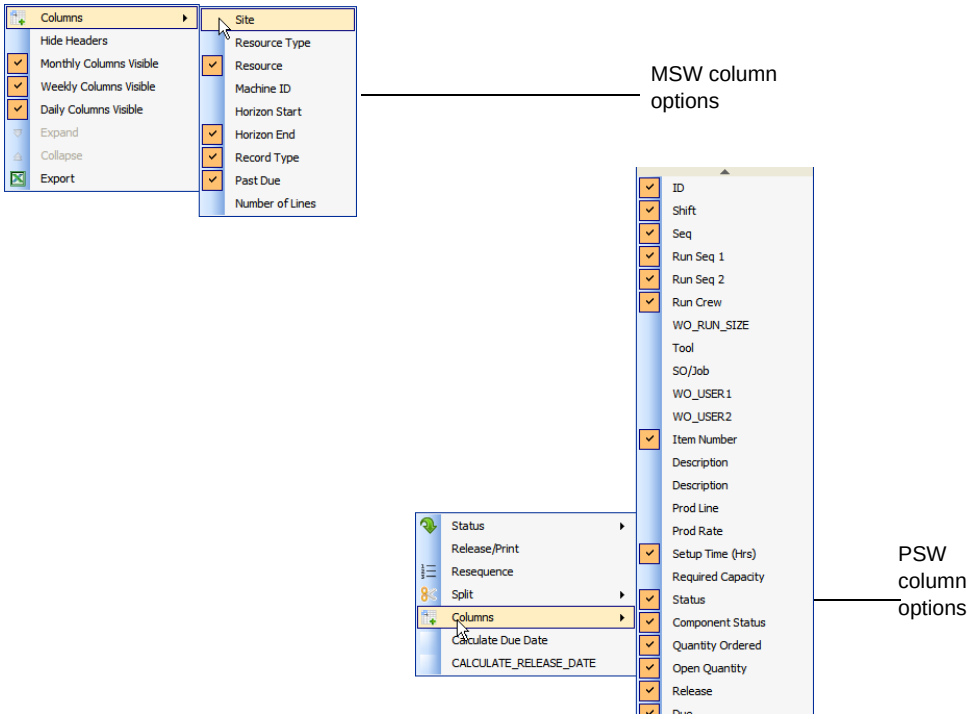
Columns

You can add hidden columns—a .NET UI feature—and select the additional column that you want to display in the workbenches.

To do this, while you are in the Schedule Grid or the Sequence Grid, right-click, then select the Columns option. The following figure depicts options for both workbenches.

You can add columns to the PSW Sequence Grid as well as add or modify column header labels, using QAD EE standard label maintenance programs.

Fig. 1.8
Column Options



Visual Indicators

The MSW displays visual status indicators to direct your attention to potential capacity and item shortage issues. The projected quantity on hand (POH) displays as soon as items display on the Schedule Grid. The system calculates the POH for every item with supply/demand in the scheduling horizon, and applies the POH status indicator to every resource that has quantities scheduled.

Table 1.1
Visual Indicator Summary

Panel/Frame	Object	Indicator	Meaning
Resource Panel	Resources		The resource includes one or more items with a supply shortage (negative POH).
MSW Capacity Panel	Remaining capacity	Yellow	The planned capacity was consumed from prior days, to satisfy the required capacity needs of the date column highlighted in yellow.

Panel/Frame	Object	Indicator	Meaning
Period Available Capacity		Red	• Period available capacity is less than or equal to 0 for every day prior to this date. AND
		Yellow	• Required capacity is greater than capacity. • Excess capacity for the day is consumed by a future shortage. • The system consumes excess capacity from a prior day.
MSW Schedule Grid and Supply/Demand Panel	Item number	Red	Projected on-hand is less than 0 (zero) within the firm scheduling horizon.
	Projected On-Hand	Yellow	Projected on-hand is less than safety stock value plus seasonal demand within the firm scheduling horizon.
		Red	Projected on-hand is negative within firm schedule period. Alternate production lines without active orders are not colored for POH. For example, when you have the same item on two production lines, and you schedule quantities on the first production line but not the second line, the system does not display colored schedule grid cells for the second production line.

Projected and Status POH

The repetitive POH calculation is as follows:

WO Open quantity + Nettable Inv – Total demand

Where:

Nettable Inv = From MRP Detail (23.16)

Total Demand = Independent + dependent + forecast + seasonal

WO Open quantity = Schedule Net Requirement Due (SNRD)

Note SNRD is the summation of production order open quantities for all production orders for a specific order due date and production line.

The POH status for both repetitive and production orders derives from the POH calculation. If any POH for that item is below safety stock, then POH status is set to safety stock status. If any POH is < 0 then the POH status is set to below-zero status.

Additionally, the repetitive and production order PAC status derives from the POH calculation. If any POH for that item is below safety stock, then POH status is set to safety stock status. If any POH is < 0 then the POH status is set to below-zero status.

Navigation Shortcuts and Keys

While you can use the mouse to click anywhere within the Schedule Grid, the following keyboard navigation shortcuts are available:

- Press Tab to move forward to the next day or to move across a row to skip the total column.
- Press Shift-Tab to move back to the previous day.
- Press the down arrow to move down to the next item.
- Press the up arrow to move up to the previous item.
- Press Enter to commit your changes without moving from the cell.

Navigation Key Limitations

Shortcuts are available only within the window currently displaying. To display additional days or items, you must click the horizontal or vertical scroll arrows. You can use the Tab key, though, to display additional days within your horizon when they do not display because of the grid size.

You cannot use the Esc key in the workbenches as you might in a spreadsheet.

Limitations

MSW and PSW do not support:

- Co-\By-products
- Standard repetitive functionality

  Note MSW and PSW do support advanced repetitive functionality.
- Integration with the QAD EE Flow Manufacturing module
- Routable items
- Scheduling for work centers

  The workbenches provide the ability to view production orders by work center; however, modifications to production orders do not result in real-time updates across all workbench panels. Due to this limitation, QAD does not support production scheduling using work centers as a resource view.
- Scheduling at the operational level

  You can use the workbenches in a discrete production order environment to schedule release and due dates at the production order or item level; however, you cannot manage discrete production order release or due dates at the operation level. When you do schedule release or due dates at the order or item level, you should set up items on production lines, using utilities described in setup sections of the MSW and PSW chapters.

Performance

The MSW/PSW and its integrated CAC data retrieval performance can be impacted when the system processes a large number of records. This section discusses features available to mitigate these performance impacts.

The system does inform you of progress by notifying you in terms of completion percentage/time in seconds.

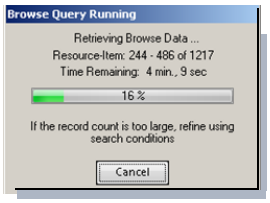
Significant improvements were made to improve performance in the workbenches in the most recent versions of the workbenches. For example, the search takes significantly less time and places a smaller load on the system that hosts the .Net UI AppServer. There were also improvements in performance, that is response time, when creating and saving work orders.

MSW/PSW Search Data Retrieval

When you invoke a search in the MSW/PSW, the system displays a dialog box to show that a data retrieval is in process. To display the time remaining to complete the data retrieval in the dialog box, set the Display Search Progress field to Yes in the MSW Search Preferences window in the Options drop-down. Setting this field to Yes, however, can impact performance. Regardless of the setting of this field, you can cancel the search at any time by pressing the Cancel button in the dialog box.

The system displays a message when the number of records you are attempting to display exceeds the maximum.

Fig. 1.9
Maximum Records



Workbenches-Integrated CAC Data Retrieval

The integrated CAC data retrieval runs in a background thread to make the MSW/PSW search data retrieval complete faster. In addition, to minimize the performance impacts of the integrated CAC data retrieval, there are several user preference options within the Component Availability window of the preferences. You selection Options, then Settings, then Component Availability to:

- Disable the CAC calculation by selecting None for the Computation Method in the CAC user preferences. When CAC is enabled, the search and save processes run CAC calculations and functions for all items the system retrieves into the workbenches when you search for records or when you save workbenches changes.
- Select Dynamic as the Computation Method in the CAC user preferences. Selecting Dynamic provides on-demand CAC calculations for only the items you select on the workbenches. When you modify a production order for a selected item and save changes, the system clears the CAC statuses for all prior work orders and items selected. Then, it recalculates the CAC statuses for the items and orders that you are currently focused on.
- Minimize the number of MRP detail records the system processes.

  You can set the CAC Horizon field. To decide on a value for this field, consider the interval of time from today into the future for CAC purposes. For example, you may be interested only in the data within the time fence number of days into the future.
- Decide which component items should be included or excluded.

  You can select the Components Included component check boxes as needed. For example, you may be interested only in non-floor stock items.

Note These settings do not pertain to the QAD EE CAC browse collections, such as Monitor Material Shortages, Release Production Order By Production Line, and so on.

Create Process Performance

The software provides a spreadsheet performance feel when you create new production orders from the workbenches. The feel helps minimize application calls to the server. When you create a new work order as the first order created for the item, the original create process occurs—typically, within two to six seconds— but all subsequent orders that you create are typically less than one second.This performance is possible because the system uses the first work order created as the master copy; then, it uses the master copy to create all subsequent orders. The system is aware of BOM or routing changes and effective dates as part of this process.

When you enter a new scheduled quantity in the MSW Schedule Grid, the system uses the planned order instead of creating a new production order when the planned order due date equals the date in the Schedule Grid. This eliminates the system need to create redundant supply records and removes MRP cleanup during the next MRP run.

Note The create performance features do not apply to base or co-/by-product items.

Chapter 2

Master Scheduling Workbench (MSW)

The following topics describe how to use the features of the Master Scheduling Workbench (MSW).

Introduction 20
Introduces the MSW, components, and features.

Accessing MSW 28
Provides procedures to access the MSW in the .NET UI.

Enabling the Workbenches 28
Tells you how to enable MSW.

Set Up 29
Describes setup steps you should perform before beginning workbenches scheduling.

MSW User Preferences 33
Lists fields, describes field input, and presents screens for all windows for user preferences.

Processing Master Schedules 38
Provides a general procedure to create and process a master schedule and describes processing results.

Working with Production Orders 47
Describes the pulled-in QAD EE menu programs and data presented in the MSW, including field descriptions for the various programs. Also, instructions to edit, modify, delete, and manipulate production orders are provided.

Viewing/Editing Order Data 54
Describes ways to view data from the MSW.

Item Specific Information 64
Describes the pulled-in QAD EE programs and data presented in the MSW, including field descriptions for the various programs that let you manipulate and view item data.

Additional Workbenches Tabs 64
Describes features and functions available through the Calendar Exceptions, Sales Quantity by Month and other workbenches tabs.

Saving Your Changes 69
Provides a procedure to save changes in MSW.

Introduction

Use the Master Scheduling Workbench (MSW) to create master schedules for medium to long periods of time (weeks to months) with supporting data to review on items, operations, demand, supply, capacity, and material.

Features

Functions within the workbench let you concurrently manage work centers and production lines within a single workbench. You can authorize work or schedule due dates for repetitive production orders on the production line and for discrete production orders on work centers. From a single workbench screen, master schedulers can:

- Split production orders.
- Reschedule or change the status of production orders.
- Maintain production order details.
- Manage production order operation lists.
- Move production orders to alternate production lines/work centers.
- Release production orders.
- Export schedules to a spreadsheet (MS Excel).

You can display:

- Supply, demand, and capacity in daily increments at the item level
- Supply, demand, and capacity in weekly and monthly buckets
- Capacity and demand issues
- A list of items requiring master scheduling attention
- Production orders that are past due, cannot complete on time, have component availability shortages, or are released
- Production order status
- Resources to be scheduled
- Demand details
- Action messages
- Item master or planning data
- Inventory details

The following topics provide more information on MSW elements, the functions they provide, and QAD EE program functions that you can access from within MSW.

Visual Indicators

MSW displays visual status indicators to direct your attention to potential capacity and item shortage issues. The projected quantity on hand (POH) displays as soon as items display on the Schedule Grid. The system calculates the POH for every item with supply/demand in the

scheduling horizon. When the resource type is a production line, the system applies the indicator to only the item's primary production line. When the resource type is a work center/machine, the system applies the indicator to any resource associated with the item.

Shortage warning status applies to required capacity, available capacity, part number, scheduled quantity, and projected on-hand (POH) quantity. Shortage warning status indicators can display as a low warning status (yellow shading), which typically applies to non-critical potential shortages; for example, when the quantity on hand does not meet safety stock requirements. A high warning status (red shading) indicates a potentially critical capacity or item shortage problem; for example, when the projected on hand quantity is less than zero. Chapter 1 summarizes visual indicators.

Quick Find

Within the MSW Schedule Grid, you can quickly find production order records by using the Quick Find feature in the toolbar.

Note You can use this feature in the PSW, too; however, since the PSW displays a limited number of orders, the order may or may not be visible in the PSW. If the order is not visible in PSW, you can switch to the MSW and find the order using the next/previous buttons.

You can enter either numbers or text in the Quick Find feature. You can be at the site level, work center level, and so on. Once results display, click on the Next arrow (>) to go from find to find, one record at a time. For examples on criteria for the Quick Find search, see "Search Criteria Examples" on page 22.

In both the Schedule Grid and the Production Order Maintenance Panel, you can easily find items by:

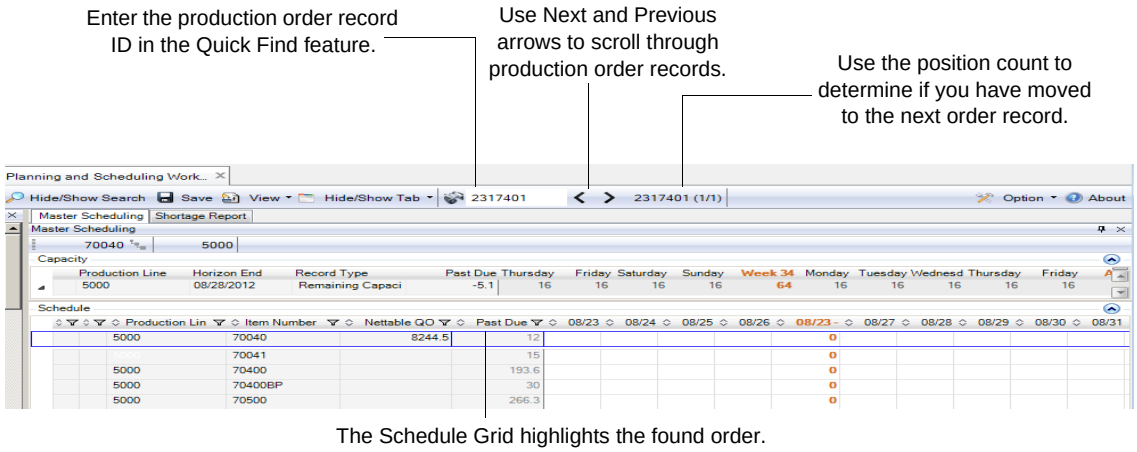
- Order ID
- Item number (when associated with a production order)
- Sales order
- Remarks
- User field 1 and 2 within the work order master table.

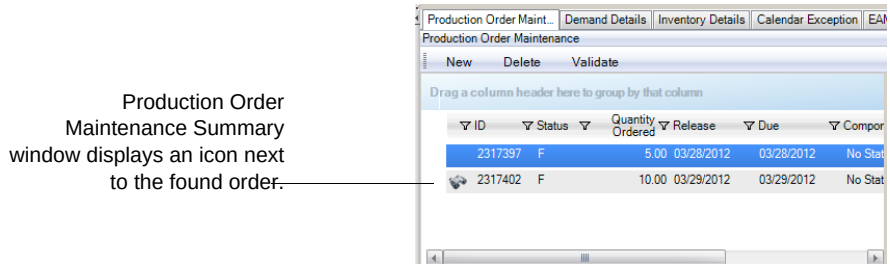
Use the following procedure to use the Quick Find feature:

1. Locate Find in the toolbar.
2. Enter numbers or text to find.

   The Schedule Grid highlights the found order with your entered values. The Production Order Maintenance Panel displays an icon in the Summary panel next to the found order; see Figure 2.1 on page 22.
3. Optionally, use the right and left arrows as Next and Previous functions to scroll through records, starting from the found record.
4. Use the position count to determine whether the display moved to the next order.

Fig. 2.1
Quick-Find Feature





Note the following regarding Quick Find abilities:

- When the system does not find any matches, the system displays a 0/0 in the position count.
- Search results are based on finding all records that contain the string you entered. To narrow the search, use the search navigators as shown in Table 2.1.
- When your results do not seem focused, click the next and previous arrows to focus the results.
- When an order has more than one field that contains a match, the system only counts this as one match.
- When you search for an item number that does not have a production order record and only a demand record, the Quick Find cannot locate the item number.
- When you have an item/order on multiple work centers or when both the production line and work center reference the same order, the system focuses on the first resource/item relationship found for the work order.
- When your results do not seem focused, click the next and previous arrow to refocus the result.
- The Quick Find does not work on Shortage Report Tab or on the PSW Production Order Browse.

Search Criteria Examples

The Quick Find search engine uses an advanced capability that lets you use special search characters in the search string to do advanced searches. The advanced search capability can be useful if you have many matches and want to narrow results.

Table 2.1 presents examples using search characters. For a complete list of symbols that you can use in Quick Find, refer to the following Web site:

http://www.autohotkey.com/docs/misc/RegEx-QuickRef.htm

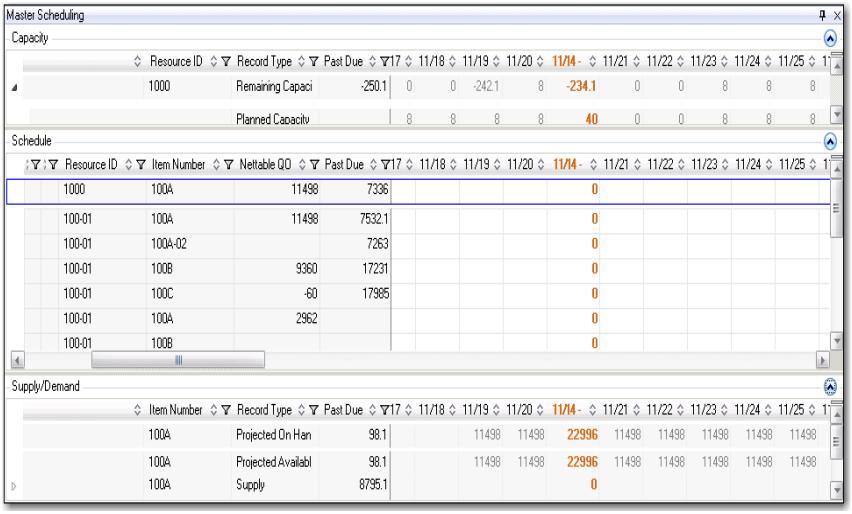
Table 2.1
Search Criteria Examples

Example Search Value	Results
023	The system finds matches on records that contain 023. For example, it finds a record for sales order SO10237.
279$	The system finds everything that ends with 279. For example, it finds order ID 13577279.
^Call 323	The system finds everything that begins with Call 323. For example, it finds orders with the remarks Call 323-555-1212.
^78923$	The system finds records that contain this and only this exact string of text. For example, it finds order ID 78923.

Workbench Elements

MSW lets you schedule items and set the production order due/release dates and quantities within a certain daily, weekly, or monthly based horizon.

Fig. 2.2
MSW



Capacity Panel

The Capacity Panel displays resource capacity. Use data in this panel to view production order required capacity. The system calculates summaries and displays required capacity and available capacity data in this grid as you enter data in the Schedule Grid. You can expand and collapse the Capacity Panel to show capacity and schedule quantities in weekly and monthly buckets. The weekly and monthly buckets are display only.

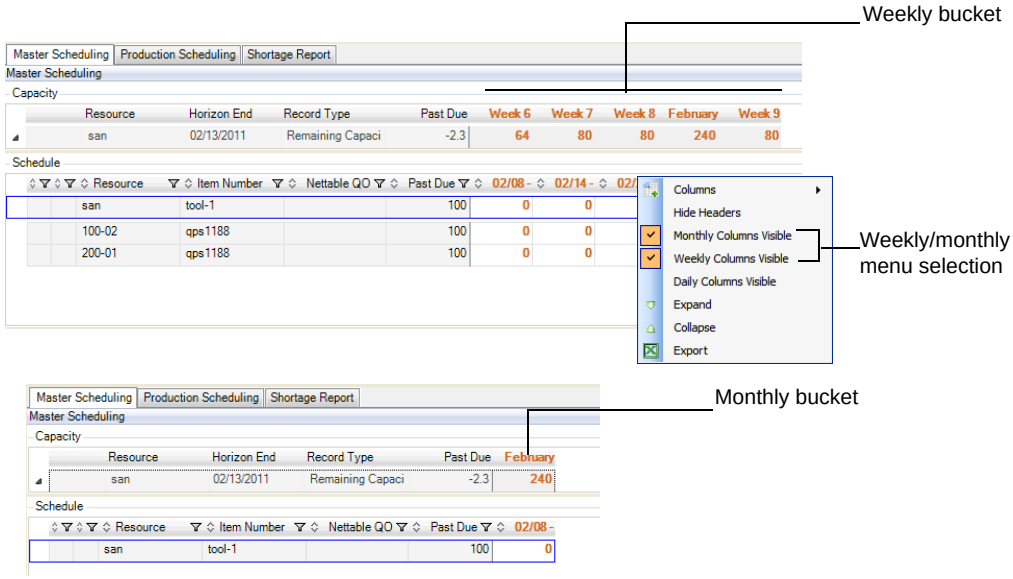
The Cumulative Capacity row in the Capacity Panel identifies the next available-to-promise date for an order and displays a rolling total of accumulated capacity over time. The cumulative capacity uses remaining capacity as the input:

[N] = each day. [N "Remaining Capacity" + Prior Day Cumulative Capacity = Cumulative Capacity of [N]

You can display capacity information in daily, weekly or monthly buckets by using a combination of User Preference and context menu settings; see Figure 2.3. Weekly and monthly buckets are display only so when you set the Schedule Grid for weekly/monthly buckets, you cannot edit data.

Note When you set up weekly or monthly bucket display for the Capacity Panel, the setting applies to the Schedule Grid and Supply/Demand Panel, too.

Fig. 2.3
Monthly and Weekly Buckets



When you start to create a schedule in the Schedule Grid for the item you selected, the system shows you the capacity impact in real-time. For information on field descriptions, see “Consume Prior Remaining Capacity” on page 35.

Schedule Grid

The Schedule Grid displays item supply records; that is, production orders, with bucketed quantities of the production order supply records for the item. The records represent the master production schedule for a given period. The summarized quantity values within the Schedule Grid are production order quantities.

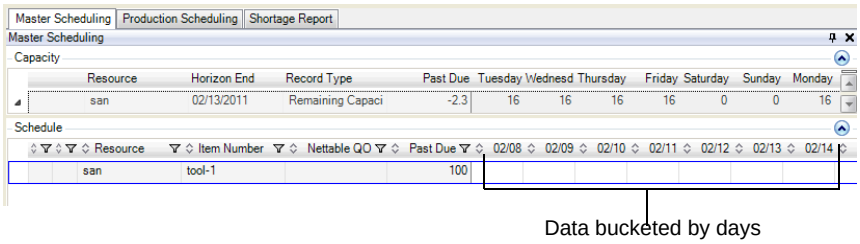
You can expand the Schedule Grid to display capacity in weekly and monthly buckets. The weekly and monthly buckets are display only, though, so you can only edit in daily buckets; see Figure 2.3.

For more information, see “MSW Schedule Grid Data” on page 42.

Daily Buckets

Each supply record is associated with one or more resources. For production orders, resources can be work centers or production lines; for repetitive orders, the resource is the production line. However, you can schedule discrete production orders on both production lines and work centers. Schedule data bucketed by day is appended on the right for the range of days identified in the data selection criteria; see Figure 2.4. You enter data in this right-hand area.

Fig. 2.4
Data Bucketed by Day



Descriptive and transactional item attributes identify items in the Schedule Grid. Descriptive item attributes are those found in the item master/detail tables; transactional item attributes include scheduled quantities past due and nettable on-hand inventory. Because the system calculates the net past due quantity remaining for an item, you can view item past due quantities as your day begins. This lets you check results of prior shifts. As you scan items, you can monitor inventory levels and easily determine the nettable inventory on hand. You can easily spot inventory levels of concern.

You can make updates to existing quantities in the Schedule Grid. When you do, the system performs POH, required capacity, and other calculations and displays changes. Also, when you make changes to some fields in the Production Order Maintenance Details tab, it can cause changes to capacity. For more information, see “Details Tab” on page 55.

Planned orders within the scheduling horizon are not included in the POH and resource required capacity calculations in MSW, so planned orders do not display in the Schedule Grid. To view planned orders, drill down to data in the Demand/Supply Grid.

Note You can also view the orders in the Production Order Maintenance window within MSW.

Supply/Demand Panel

Use the information in the Supply/Demand Panel to view the item’s total demand and total supply data over a period of time. Total demand is from sales, DRP, forecast, seasonal demand, or dependent demand. Total supply is from planned, firm, released production orders, or purchase orders.

The Supply/Demand Panel displays the record type and past due quantities. You can also view cumulative ATP, demand, projected available balance, POH, receipts, seasonal/safety stock, and supply as the record type.

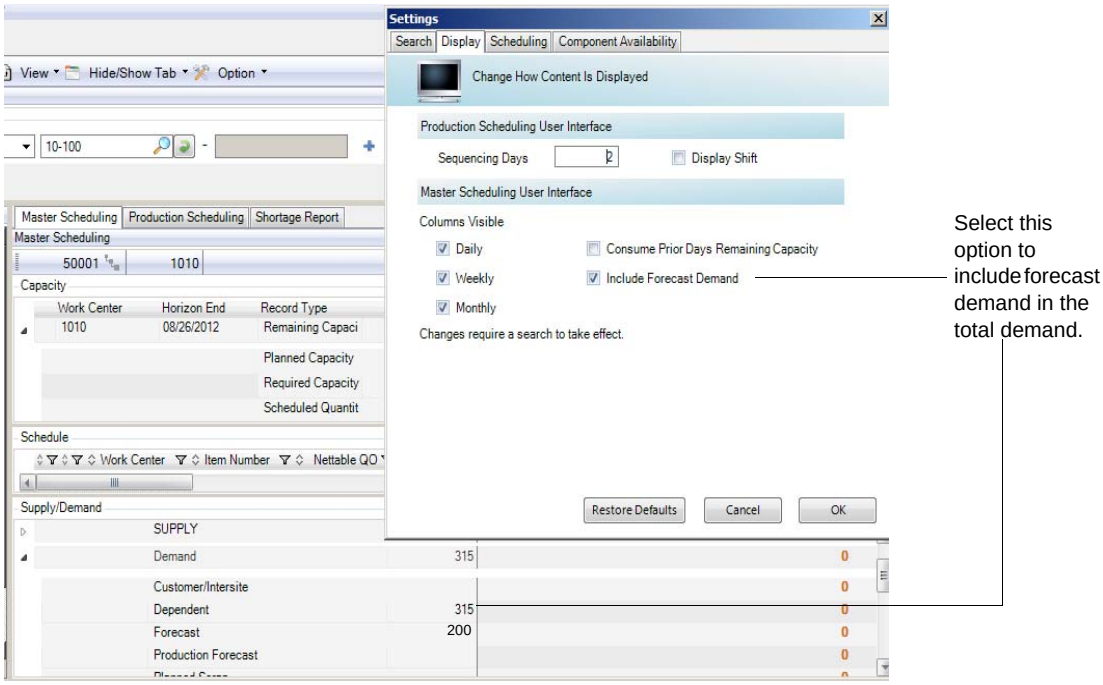
When you enter or update a scheduled quantity in the Schedule Grid, the Supply/Demand Panel is updated to show the remaining open quantity due for the item. Whether the resource selected is a production line or work center, the Supply/Demand Panel displays the quantity and due data from production orders.

When you want more details related to the demand information that shows in the Supply/Demand Panel, you can select the Demand Details tab within Production Order Maintenance to view demand details for the item selected in the Schedule Grid. For more information, see “Working with Supply/Demand Panel Data” on page 45.

Dynamic Forecast

The system includes forecast dynamically in the Supply/Demand Panel when you select the Include Forecast Demand option within the Display tab of the user preferences. You do not have to refresh your search data when you enable Forecast Demand in user preferences as the system includes the forecast demand within the total demand. When you disable Include Forecast Demand, you can still view the forecast demand.

Fig. 2.5
Dynamic Forecast Demand



Seasonal Demand

The system performs the following calculation for each date when a Master Scheduled receipt is due or a seasonal build quantity is made available, causing a net increase in supply. It takes into account all sales order and required ship schedule demand and gross requirements up to the next increase in available supply.

Master Scheduled Receipt – Sales Orders and Required Ship Schedules – Gross Item Requirements – Seasonal Build Net Increases + Seasonal Build Net Decreases = ATP

Past due is not calculated.

Independent/Dependent Demand

Repetitive independent and dependent calculations are based on the following function:

summarize mrp_quantity

Where:

For independent demand, mrp_dataset = sod_det, cs sch_mstr, ds_det, sob_det, pb_sold, pbo_sold

For dependent demand, mrp_dataset = jp_det, wod_det, wo_scrap

The past due independent demand calculation is as follows:

Summarize mrp_quantity prior to the beginning date

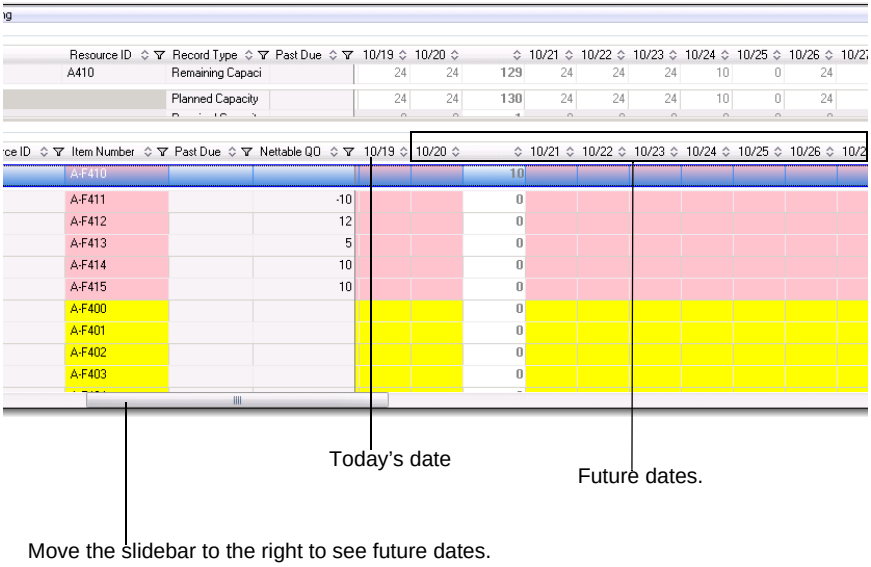
Schedule Horizon

MSW gives you user-configurable control over where the MPS schedule horizon ends and where the future window begins. MSW calculates data differently in the scheduling horizon display than in the future window. Visual indicators only apply to the defined scheduling horizon.

Fields in Work Center Maintenance (14.5) are also available in Production Line Maintenance (18.1.1) and help control the schedule horizon. Specifically, you set the Horizon End field to either Day, Week, or Month, then set the number of periods for the increment in those programs. The system displays a read-only calculate date. The system calculates the date from period and period number, so if you set Horizon End to Day and Period to 5, the Calculate Date is five days starting with today. If you set Horizon End to Week and Period to 4, then the Calculate Date is four weeks from now including today.

Figure 2.6 shows a sample time line in the MSW Schedule Grid. The left side shows the Schedule summary, while the right side shows individual dates, starting with today's date of October 19.

Fig. 2.6
Scheduling Period Example



Even though your future horizon may not fit into the.NET UI window on your screen, you can use the slidebar to display day-by-day future dates. When you scroll into future days, the day-by-day regions of the Capacity and Supply/Demand Panels are also scrolled.

Within MSW, only production orders with a status other than P within the MPS Scheduling Horizon impact these calculations:

- POH
- Available to promise
- Required capacity

MSW does not calculate for planned orders inside the scheduling horizon; however, you can view planned orders using supporting data in other programs within the MSW. To view a planned production order, view data in:

- Demand Details tab
- Production Order Maintenance tab
- Supply row in Supply/Demand Panel

The scheduling horizon impacts the color logic, POH, auto firm, and resource required capacity within the Schedule Grid.

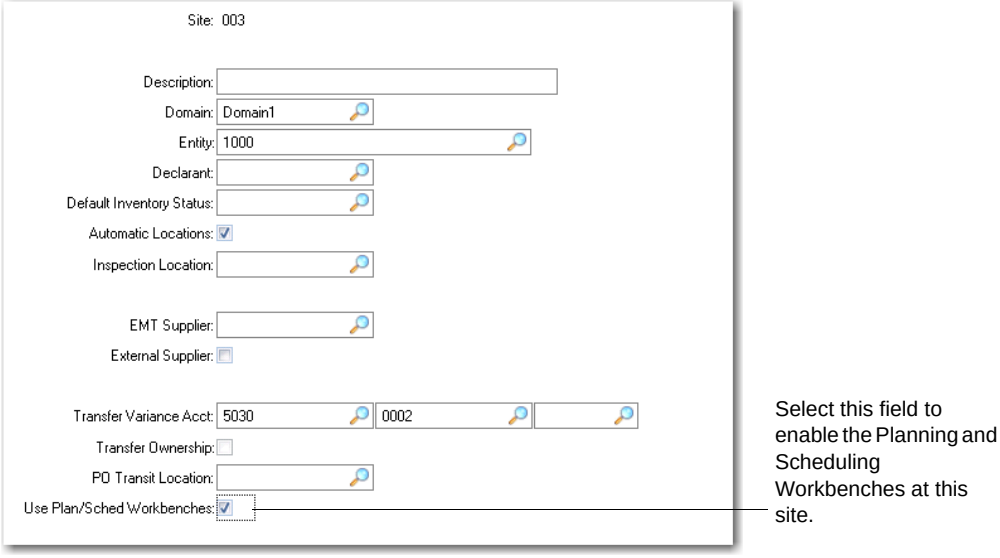
Accessing MSW

You access the MSW through QAD.NET UI. You can enter the full name—Master Scheduling Workbench—or a partial name in the Applications field. You can also add MSW to your list of favorites.

Enabling the Workbenches

You must set the Use Plan/Sched Workbenches field within QAD EE Site Maintenance (1.1.13) so that your site is enabled to run the workbenches.

Fig. 2.7
Site Maintenance (1.1.13), Use Plan/Sched Workbenches Field



Use Plan/Sched Workbenches. Select this field to enable the Planning and Scheduling Workbenches for this site.

No: You cannot run the MSW or PSW workbenches for this site. Use Work Order (16) and Repetitive Menu (18) programs as usual.

Yes: Setting this field to Yes lets you use the MSW or PSW for this site.

When a site is enabled to run MSW or PSW, you run MRP for the site to create planned orders; then within MSW, you run a search to retrieve the orders for the item/site.

So, when a site is enabled to run the MSW and PSW workbenches, Capacity Requirements Planning (CRP) runs as part of MRP for orders that have a P status. When CRP runs as part of MRP, the system:

- Explodes planned orders as they are created
- Lets you access the orders using the work center schedule resource in MSW

Setting this field to Yes also disables the following programs:

- Schedule Maintenance (18.2.1 and 18.22.2.1)
- Schedule Explosion (18.2.4)
- Cumulative Completed Maintenance (18.6)
- Line Schedule Workbench (18.22.1.10)
- Line Allocation Maintenance (18.22.1.11)
- Schedule Explosion (18.22.2.4)
- Cumulative Completed Maintenance (18.22.2.6)
- Planned Repetitive Schedule Approval (23.8)

When you enable the workbenches, the system recalculates schedule consumption that was calculated in these programs:

- Backflush Transaction (18.22.13)
- Reject Transaction (18.22.16)
- Rework Transaction (18.22.17)
- Scrap Transaction (18.22.18)
- Move Transaction (18.22.19)
- WIP Adjust Transaction (18.22.21)

Set Up

You should perform the following setup steps before you begin scheduling in the workbenches:

- Synchronize Resource Tables
- Set Up Production Lines

Synchronize Resource Tables

Use Synchronize Resource Tables (16.25.14) to build or rebuild resource master (prs_mstr) and item/resource detail (prsd_det) tables. These tables hold production line, work center, and item information that the QAD Planning and Scheduling Workbenches use to determine which production lines, work centers, and items to retrieve as a result of a workbenches search.

You must run Synchronize Resource Tables:

- Before you run the planning/scheduling workbenches.
- For your domain if your company has multiple domains and use the planning and scheduling workbenches for each domain.

To run the program, you enable the Synchronize field to start the resource table synchronization. Once you do, the system deletes existing table records, then builds the table records again based on the latest data in the database.

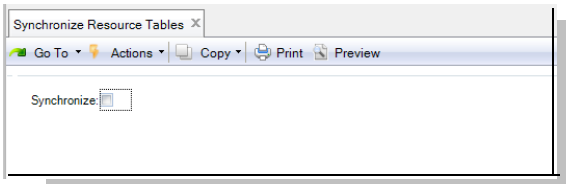
For each production line, the system creates:

- A resource master record for every production line you define in the system.
- An item resource detail record for each production line item record attached to the production line.

For each work center, the system creates:

- A resource master record that links every work center in the system with each site you define in the system. The system skips work center/site combinations when the site has no production orders defined for it.
- An item resource detail record that associates the work centers on the routing records with the site and item on the production order.

Fig. 2.8
Synchronize Resource Tables (16.25.14)



Synchronize. Enter Yes to enable the synchronization of resources—work centers, production lines, and items—for use by the QAD Planning and Scheduling Workbenches.

Set Up Production Lines

You can set up items on production lines to be updated in a mass update method within QAD EE:

- Use Production Line Item Create (18.22.1.20) to set up items on production lines in a mass setup method.
- Use Production Line Item Update (18.22.1.21) to update the production lines/item in a mass update method that you previously set up using Production Line Item Create.

Production Line Item Create

If you have used QAD EE for scheduling, you probably have production orders, but you may or may not have items on production lines set up. To create a repetitive master and production schedule for production lines, and not work centers, you must have items tied to a production line or lines. To avoid manual re-entry of setup data, you can use Production Line Item Create to:

- Mass set up items on primary production lines.
- Mass set up items on alternate production lines.

This ensures that the MSW/PSW displays data and alerts the scheduler of all items requiring attention.

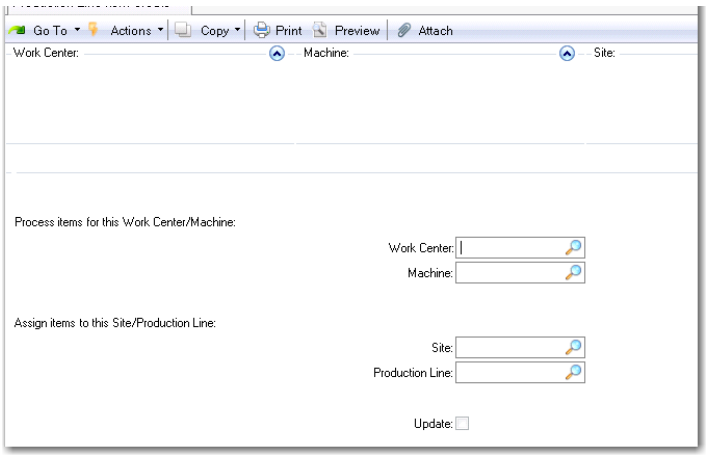
Since this program automates the setup of items on production lines, it also reduces the chances of newly introduced items not being added to a production line, which would prevent you from scheduling the item.

The program locates sites where the item routing contains a specified work center/machine, and for those items, associates the items with a specified production line. If the item has no routing (no item/resource record), the program does not find the item to associate with a production line.

The output report contains the following information:

- For each item, the current primary production and alternate production lines
- For each item, the new target production line

Fig. 2.9
Production Line Item Create (18.22.1.20)



Process Items for this Work Center/Machine:

Work Center. Items processed by this work center within the routing.

Machine. Items processed by this machine within the routing.

Assign Items to This Site/Production Line:

Site. The site to process.

Production Line. The production line to associate items to for the update.

Update. Specify Yes to update according to criteria you set here.

Production Line Item Update

You can use Production Line Item Update to mass update the setup. Use the program to:

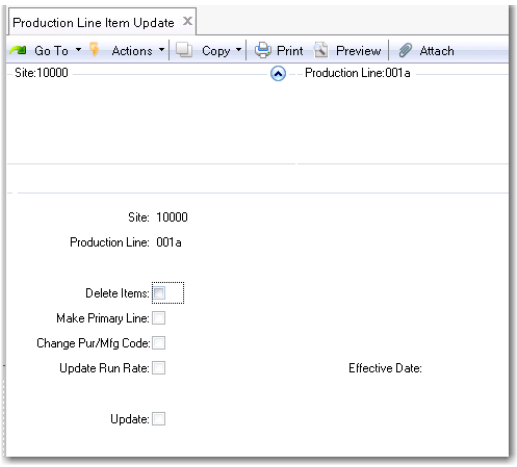
- Apply the default production line run rate against all items on a production line.
- Apply run rates to production lines.
- Make a production line the primary line.
- Delete items from a production line.

- Update the Pur/Mfg code for all items on a production line when you have not historically maintained the Pur/Mfg code. The following table shows you the Pur/Mfg codes for production orders and order types. This information is useful when you have not maintained Pur/Mfg codes before.

Table 2.2
Pur/Mfg Codes for Production Orders

Pur/Mfg Code	Production Order Status	Production Order Type
N/A	P	Generic
Blank	F	Discrete
M	F	Discrete
L	E	Repetitive
All others	F	Discrete

Fig. 2.10
Production Line Item Update (18.22.1.21)



Site. The target site for the production line/items.

Production Line. The target production line/items for applied actions.

Delete Items. Lets you remove all items from production lines.

Make Primary Line. Lets you change the primary line of the existing item/production line target relationship.

Update Run Rate. Lets you apply the production line run rate against all items assigned to the target production line.

The Effective Date field associated with the Update Run Rate field informs the system of the starting point at which to update production line records. For example, you may only want to update recent records to reflect the new run rate but not older records because your company retains older records for historical purposes.

Change Item Pur/Mfg Code. Lets you change the item master and site master (if it exists) Pur/Mfg code on all items associated with the production line.

MSW User Preferences

The following topics discuss options available to you when configuring MSW:

- Setting the MSW Schedule Horizon
- MSW Display Preferences
- MSW Consume Prior Remaining Capacity
- MSW Scheduling Preferences

Setting the MSW Schedule Horizon

You can configure the scheduling horizon so that you work with the number of days that make up your company's master schedule.

You can change the schedule horizon dynamically through the Preferences pull-down menu. You select Options, then Preferences, then Search to set the future and history horizon.

Note Before you search, you need to set the schedule horizon; see "MSW Scheduling Preferences" on page 37.

Note Fields in Work Center Maintenance (14.5) also display in Production Line Maintenance (18.1.1) and help control the schedule horizon end and the number of periods within the schedule horizon. The Preferences settings control how far out in time you can view dates on the Schedule Grid; see Figure 2.11.

Fig. 2.11
Preferences

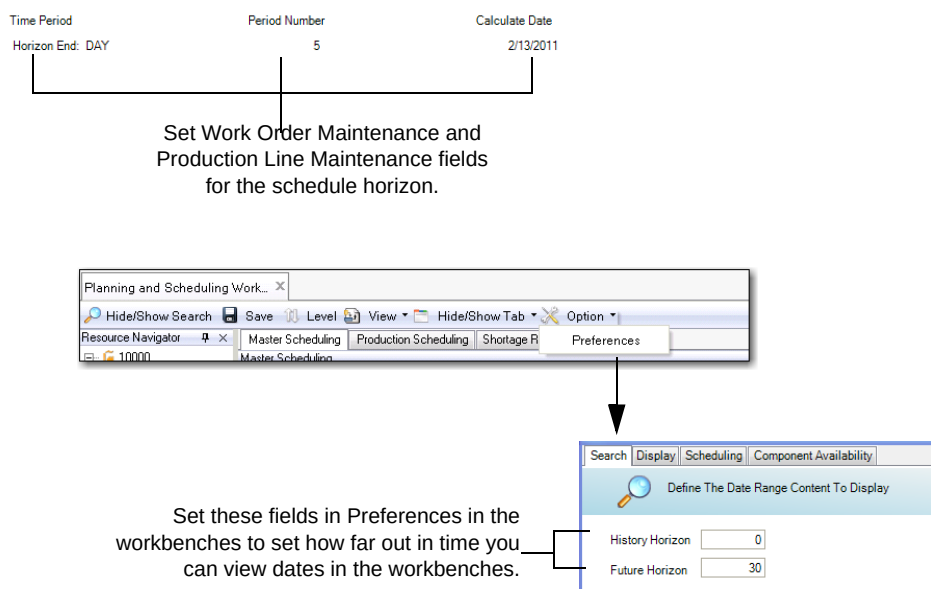
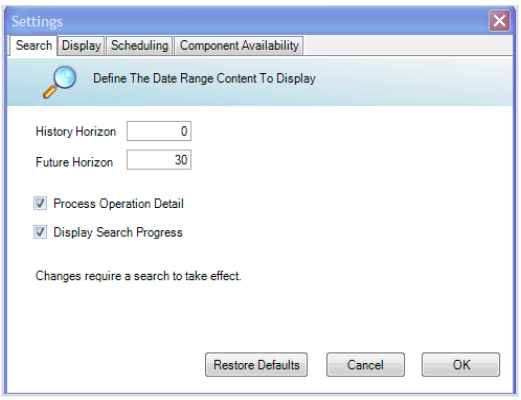


Fig. 2.12
MSW, Search Preferences



History Horizon. Enter the number of days that constitute the past days of your history horizon.

Once you set the History Horizon, you must perform a search to have data within the set horizon.

Future Horizon. Enter the number of days that constitute your future horizon.

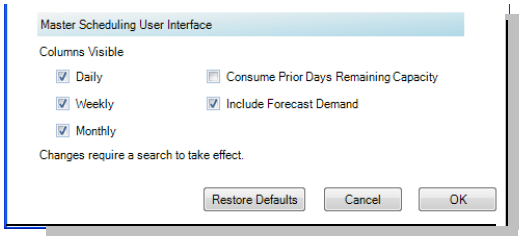
Process Operation Details. Indicate Yes for MSW to retrieve and display operation details for production orders.

Display Search Progress. Specify Yes or No to have the system display its progress when retrieving records. Depending upon search criteria that you set, the number of records that the system retrieves can be quite large. If you set this field to Yes, the system informs you of its progress in minutes to retrieve the records. Chapter 1 describes Limitations.

MSW Display Preferences

Use the Display tab of the Settings window to define the increment by which MSW calculates totals. Select Option, Preferences, then the Display Tab.

Fig. 2.13
MSW, Display Preferences



Columns Visible. Specify Daily, Weekly, or Monthly as the increment by which scheduling totals are displayed in the Schedule Grid. When you enter a value, the totals in the Supply/Demand Panel, Capacity Panel, and Schedule Grid display by the increment you enter. You still view data by daily increments in the Schedule Grid. When you select weekly or monthly, you must expand those increments to access the daily display. MSW uses the calendar definition of a month and the GL calendar period for the week.

Include Forecast Demand. Specify Yes to include the forecast demand in the Demand row in the MSW Supply/Demand Data grid as part of the POH calculation. When you enable this option, you do not have to refresh your screen with a new search to see the forecast demand in the Suppy/Demand Panel. You can click on the Demand field in the Supply/Demand Panel to see the forecast demand and to have it automatically included in the Demand field.

For forecast demand, the system displays the net balance of current forecast demand from QAD EE for the selected item. Master production scheduling and MRP use the net forecast and sales order demand to calculate total demand. The net forecast is calculated as follows:

Net Forecast = Forecast – Sales Order Demand

Note When the shipment forecast is oversold—that is, the quantity sold exceeds the forecast amount—the net forecast will not go below zero.

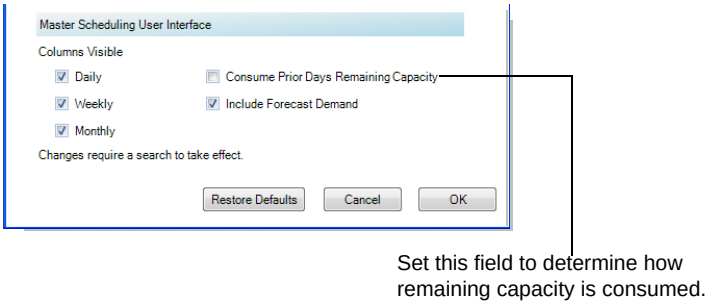
Past due is not calculated.

Consume Prior Remaining Capacity. For information on the Consume Prior Remaining Capacity field, refer to “MSW Consume Prior Remaining Capacity” on page 35.

MSW Consume Prior Remaining Capacity

You can specify whether capacity is consumed by future required capacity or not by setting the Consume Prior Remaining Capacity field in the Display Window of User Preferences. Color coding extends beyond the firm scheduling horizon for visibility of capacity shortages. When you set the field to Yes, the cell displays with yellow shading when the system uses available capacity from prior days to satisfy the required capacity. It displays with red shading when there is not enough available capacity on or in days prior to the required capacity date.

Fig. 2.14
Display Window, Remaining Capacity Setup



Consume Prior Remaining Capacity. Specify whether prior days remaining capacity is consumed by future required capacity.

Yes: The prior days remaining capacity is consumed by future required capacity. In Figure 2.15, on Tuesday, 7/13, 12.5 hours of capacity are required; however, only 8 hours of capacity are available. When this field is set to Yes, the system looks at remaining capacity before Tuesday to determine whether the Tuesday work can be completed on time. The system finds 8 hours of available capacity on Monday 7/12. So, if the Tuesday work starts on Monday, then 4.5 hours can be used from Monday, and all Tuesday work can be completed on time.

No: The prior days remaining capacity is not consumed by future required capacity.

Fig. 2.15
Capacity Example 1

Master Scheduling

Capacity

Resource ID	Horizon Start	Horizon End	Record Type	Past Due	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday	07/05 - 07/	Monday	Tuesday	Wednesd
pl-asm		7/12	Remaining Capacity	-18	0	-10	6	8	7	4.7	15.7	3.5	0	0.3
			Planned Capacity		0	8	8	8	7	8	39	8	8	8
			Required Capacity	18	18	0	2	0	0	3.3	23.3	0	12.5	4.5
			Scheduled Quantity	180	180	0	20	0	0	33	233	0	125	45

Figure 2.16 shows results when the field is set to No. In the figure, the number of remaining capacity hours for Tuesday shows as –18. Tuesday 7/12 displays –4.5 hours remaining and the system did not consume prior remaining capacity available on Monday. The system displays colors beyond the firm scheduling horizon for the capacity frame.

Fig. 2.16
Capacity, Example 2

Master Scheduling

Capacity

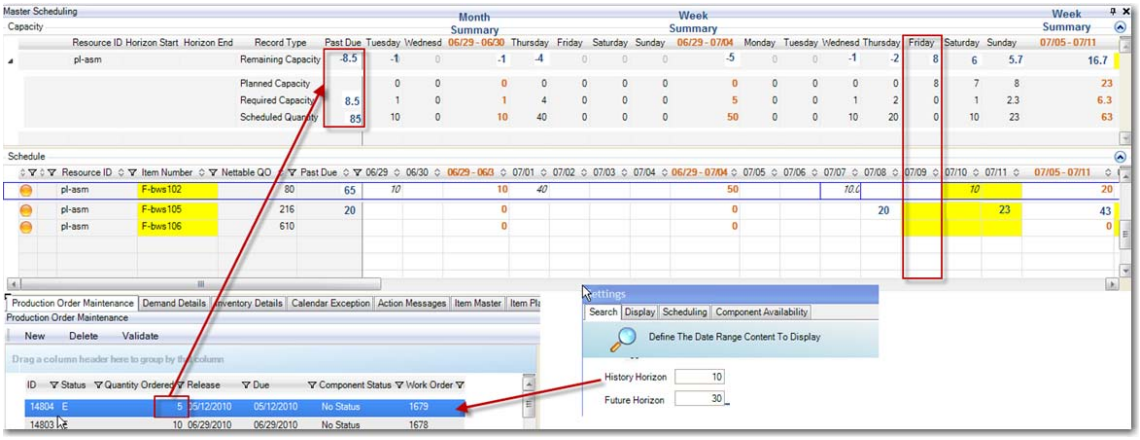
Resource ID	Horizon Start	Horizon End	Record Type	Past Due	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday	07/05 - 07/	Monday	Tuesday	Wedn
pl-asm		7/12	Remaining Capacity	-18	-18	8	6	8	7	4.7	15.7	8	-4.5	0.3
			Planned Capacity		0	8	8	8	7	8	39	8	8	8
			Required Capacity	18	18	0	2	0	0	3.3	23.3	0	12.5	4.5
			Scheduled Quantity	180	180	0	20	0	0	33	233	0	125	45

The remaining capacity row displays a daily delta between the required capacity and planned capacity with no consumption of remaining capacity of prior days. For the daily delta calculation:

- The firm scheduling horizon still excludes planned orders.
- The future horizon includes all open orders.

In the following figure, the history horizon was set to 10 days, the future horizon was set to 30 days, and the current date is Friday, 07/09. The past due column totals display past due records; however, the history horizon columns display past due requirements in the Monthly and Weekly Summaries categories. The past due quantity of 5 from 5/12/2010, as shown in the Production Order Maintenance window below the grid, is summarized in the Past Due column. Even though the history horizon is 10 days, the system pulls in all past due supply/demand records.

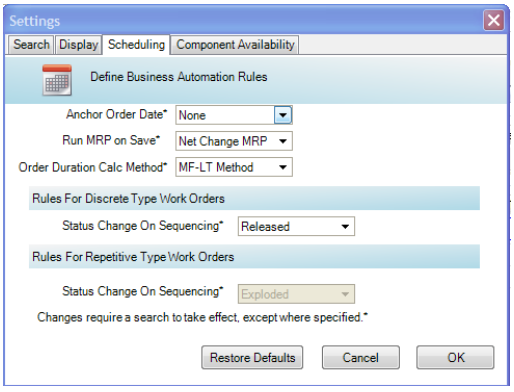
Fig. 2.17
History Horizon, Daily Net Calculations



MSW Scheduling Preferences

QAD EE applies a set of rules based on the production order status. You can set preferences for the rules under the Option menu in the toolbar. Select Preferences, then Scheduling.

Fig. 2.18
MSW, Scheduling Window



For MSW, you can set options to:

- Run MRP on save.
- Select the method for duration calculations.

Run MRP on Save

Run MRP on Save. Optionally, you can run MRP when you save your changes in MSW. Choose from:

Select Net Change MRP: The system runs MRP for all changes made within MSW.

Selective Change MRP: The system runs MRP for only selected portions of the schedule that you changed in MSW.

None: MRP is not run when saving changes.

There are additional steps required to run MRP:

- Set up a batch in Batch ID Maintenance (36.14.1). Set the following fields:
  - Set Permanent to Yes.
  - Set the Priority to your desired priority.
- Run Net Change Materials Plan (23.1) with the Batch ID and the set of values that you want to run for MSW / PSW.
- Run Batch Request Processor (36.14.13) in the background. Set the following fields:
  - Set the Batch ID.
  - Set Repeat Processing to Yes.
  - Set Pause Seconds before Report to your preference.

Select the Method for Duration Calculations

You can set the Order Duration Calc Method in the Scheduling tab. This sets the method to calculate the order duration when the order is firmed, created, and modified (future). For more information on order duration, see “Projected Duration” on page 59.

Order Duration Calc Method. Enter the calculation method for duration. The default is MF-LT. You can change the duration calculation method during the scheduling process; the change is effective immediately.

MF-LT: Calculates with manufacturing lead time.

Order - Release Date: Calculates the release date using the order duration hour.

Order - Due Date: Calculates the due date using the order duration hour.

Processing Master Schedules

This section tells you how to process your master schedules using MSW. A generic procedure is provided, along with descriptions of the fields within each grid. Individual tasks for the production orders that display follow the grid and field explanations.

MSW General Procedure

Before you begin, you should have set fields in Options under the Preferences pull-down menu; this includes setting history/future horizon, scheduling total options, and other scheduling options.

There are many different ways to access resource and scheduling data within MSW, and many different functions that you can perform using the data for a master schedule. The following provides instructions that tell you how you can leverage the MSW for master scheduling purposes using key information in the MSW:

1. From the Search Grid, select Scheduler ID for the first field, equals to in the operator search field, then your user ID in the third search field.

   Note Scheduler ID is a method to group resources. This is not the same as the Planner or Scheduler ID within QAD EE programs.

The system displays resources and items related to the Scheduler ID. The system retrieves all transactional, demand, and supply records for items with dates that also match the History and Future Horizon values that you set in Options.

2 From the Views pull-down menu, select Save or Save As to save the view. If you select Save As, name your view, then save the view.

3 Identify resources and items that require scheduling intervention.

In the Scheduling Grid, items with scheduling issues have the item number field colored red or yellow depending on the issue at hand.

- Locate resources that have items with negative POH for every item with supply/demand within the scheduling horizon. The system reveals a visual indicator showing that one or more items on the resource have POH issues.
- Locate resources that have items with safety-stock issues within the scheduling horizon.
- Locate completed scheduled quantities and open scheduled quantities.
- Consider both static data and transactional data pertaining to the item. View any of the supporting data in the Supply/Demand Panel and view other details in the secondary tabs/browses, such as production orders, item planning, demand details, action messages, calendar exceptions and so on

4 Identify and correct capacity issues.

The Capacity Panel displays visual indicators for period available capacity issues through the scheduling horizon. If the daily required capacity is greater than planned capacity for a given day, the daily required capacity field for that day is highlighted in yellow. If the period available capacity is less than zero for a given day, that day is highlighted in red.

If the capacity is insufficient for the primary resource an item is produced on and you have set up alternate production lines for the item, you can assign the item to an alternate production line in Production Line Maintenance (18.1.1). You can select the alternate production line or work center from the Resource Panel when you select the Site in the Resource Panel.

You can adjust capacity, for example, through the Calendar Exception tab in the Workbenches. You can also use QAD EE menus to add or subtract workday hours as needed for a work center. You can adjust the required capacity by modifying order due dates.

5 Schedule items by:

- Changing the quantity of items in the daily buckets in the right side of the Schedule Grid. When there is more than one production order behind a cell in the Schedule Grid, that cell's quantity displays in gray text, indicating that the cell cannot be directly updated. In this case, you can modify the quantities related to the cell using the Production Order Maintenance tab.
- Retrieving the production order in Production Order Maintenance within MSW, then modifying the quantity, dates, or status of the order.
  - Modifying order operations, setup, or runtime
  - Aligning order dates
  - Creating a new production order
  - Deleting, copying, or splitting orders
  - Identifying and correcting capacity issues

6 Monitor a production order by displaying:
   - Order supply summary or history
   - Order details or attributes
   - Production rates or comments
   - Order dates, times, shop floor activities
   - Basic and detailed routing data
   - Inventory details

7 Save your changes and optionally run MRP automatically upon the save.

8 Repeat the process until issues have been resolved for all resources.

9 Report production.

MSW Capacity Panel Data

This panel includes required capacity and capacity information for the selected resource on each day of the schedule horizon, starting with the current day. Also, you can expand and collapse the Capacity Panel to show schedule quantities in weekly and monthly buckets. The weekly and monthly buckets are display only.

Capacity calculations start from the current system date and include the daily capacity. If the capacity results in a negative value, the system attempts to consume the excess capacity available from previous days and continues the consumption until either the available capacity is zero or all previous days' excess capacity is consumed. The capacity calculation runs from the system date until the last day of the schedule horizon. When past due, the period available capacity is zero minus the past due required capacity.

In the Capacity Panel, you can optionally display the daily delta of required and planned capacity in the MSW. You can set the Consume Prior Remaining Capacity to No; you can see a daily delta calculation in the Remaining Capacity field. For more information, see "MSW Consume Prior Remaining Capacity" on page 35.

The following figure show how you can see capacity trends across resources—production lines and work centers—at the same time by selecting Site in the resource navigator. Or, you can see capacity trends across only your production lines, only your work centers, or only a particular resource.

Fig. 2.19
Capacity Panel

Capacity

Resource ID	Horizon End	Record Type	Past Due	Thursday	Friday	Saturday	Sunday	07/29 - 08/	Monday	Tuesday	Wednesd	Thursday	Friday
bmb1	08/31/2010	Remaining Capacity	-22.6	-10.6	12	0	0	1.4	2	12	12	12	1
		Planned Capacity		12	12	0	0	24	12	12	12	12	1
		Required Capacity	22.6	0	0	0	0	0	10	0	0	0	
		Scheduled Quantity	226	0	0	0	0	0	100	0	0	0	
Resource ID	Horizon End	Record Type	Past Due	Thursday	Friday	Saturday	Sunday	07/29 - 08/	Monday	Tuesday	Wednesd	Thursday	Friday
san	07/29/2010	Remaining Capacity	-10	-10	0	0	0	-10	0	0	0	0	

You can toggle the Capacity Panel to show only remaining capacity. You can optionally hide fields within the grid. When you collapse or hide aspects of the grid, however, you may lose sight of the firm schedule horizon dates that display in the grid. The panel includes the following fields:

Resource ID. The valid system identifier for the resource.

Record Type. The following are the different record types:

- Planned Capacity

  This row displays the daily calculated capacity (in hours) based on production line or work center capacity parameters. It does not include past-due capacity; the Past Due column is always set to 0 (zero) and shows no hours.

  The workbenches determine the planned capacity of a production line by considering the capacity defined for shifts in Shift Maintenance (18.22.1.22) and the number of production lines/machines available to the shift per the production line. The capacity defined in Shift Maintenance is always defined as the hours of operation for the production line with 24 hours maximum, regardless of the number of lines/machines the production line represents.

Example You define the production line capacity in terms of the operating hours within a day, maximum 24 hours. You also define the number of lines/machines the production line represents that the system uses to compute the total planned capacity of the production line. The system:

- Calculates the planned capacity on the MSW by taking the capacity defined in Shift Calendar Maintenance times the number of production lines, defined on the production line header record.
- Calculates the planned capacity on the PSW by taking the capacity defined in the Shift Calendar Maintenance for each shift times the number of production lines defined on the production line header record.
- Adjusts the current computation that calculates the weighted and shift level productivity to consider the number of lines on the production line header record.

  For the workbenches, the planned capacity formula is:

  *Working hours * Number of Lines*

  Where:

  Number of Lines is the number of lines/machines the system uses to process the production order. The system uses the Number Of Lines field also to calculate the production order duration by dividing the production run time/resources.

  For standard capacity, the formula is:

  Standard capacity = Working hours per week / working days per week

  The repetitive formula for planned capacity is as follows:

  *Planned capacity = shift hours (shift_hour[1-4]) * shift efficiency (shift_load[1-4]) / 100 + shift adjustments (cal_det)*

  Where:

  hd_mstr = holiday master

  shft_det =shift detail

  cal_det = calendar detail or non-work hours/days

The production order formula is as follows:

capacity = WC capacity + Sum of adjustments (cal_det)

The calculation for a production line is as follows:

Capacity per day = [Repetitive shift hours available - Downtime + /- Holiday Calendar]

The calculation for a work center is as follows:

Capacity per day = [Shop Calendar hours - Holiday Calendar]

The past due calculation is always 0 (zero).

- Remaining Capacity

  Identifies the resource required capacity overages and shortages based on a period calculation to help you isolate scheduling issues; see"Consume Prior Remaining Capacity" on page 35.

- Required Capacity

  Identifies the capacity required for this resource (the *load* for the resource). Capacity shortage is calculated as capacity minus the load.

  The repetitive and production order period available capacity is as follows:

  If capacity – DailyLoad < 0, then PAC =
  (capacity – DailyLoad + previous day capacity if > 0).

  Previous day consumption continues until today.

  If capacity – DailyLoad > 0 then PAC = (capacity - DailyLoad)

  This calculation can be affected by future day consumption.

  The past due period available capacity is as follows:

  *Past due DailyLoad * –1*

  The value is negative because it represents load that was due in the past. The calculation consumes just enough of the previous days' available capacity to cover the current day's gap. Since the calculation consumes previous days' capacity, both previous and current days' values are adjusted.

- Scheduled Quantity

  Identities the capacity, in terms of quantity, scheduled for this resource.

Horizon End. Displays the date that indicates the end of the schedule horizon.

Past Due. This field displays past due capacity requirements.

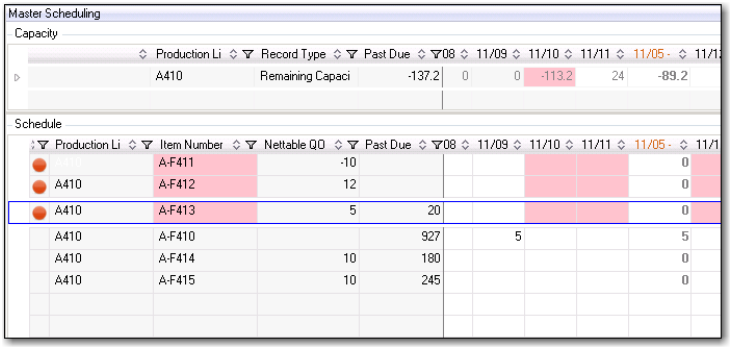
MSW Schedule Grid Data

The Schedule Grid displays item supply records—production orders—with bucketed quantities of the production order supply records for the item. The records represent the master production schedule for a given period. When you select an item by clicking a daily schedule cell, the entire row is highlighted within blue lining. Additional visual indicators call your attention to potential issues.

Also, you can expand and collapse the Schedule Grid to show schedule quantities in weekly and monthly buckets. The weekly and monthly buckets are display only.

When you make a change that remedies the problem, the system updates the cell to remove the color indicator.

Fig. 2.20
Schedule Grid



The following topics describe fields unique to the Schedule Grid. Other fields also found in other QAD EE programs are not described below:

Item Number. The valid system item number.

Nettable QOH. This column displays the nettable inventory on-hand. Nettable is an inventory status attribute that determines whether MRP includes items in its planning. As you scan items, use the data in this column to monitor inventory levels and easily identify inventory levels with issues or concerns.

Past Due. The MSW Past Due field displays past due scheduled quantities.

You can also display the run sequence of an item in the grid. If multiple items are produced on a single production line, efficiency can be improved by producing the items in a certain order. Run sequences let you control the order, or sequence, in which items are scheduled on a production line.

Displaying Product Structure Levels

When customers increase demand for an end item with an immediate due date, the demand change causes an increase in the schedule. Schedulers may have to increase one or more lower assembly schedules to meet this short-term demand; however, there may not be enough sub-assemblies to produce the item.

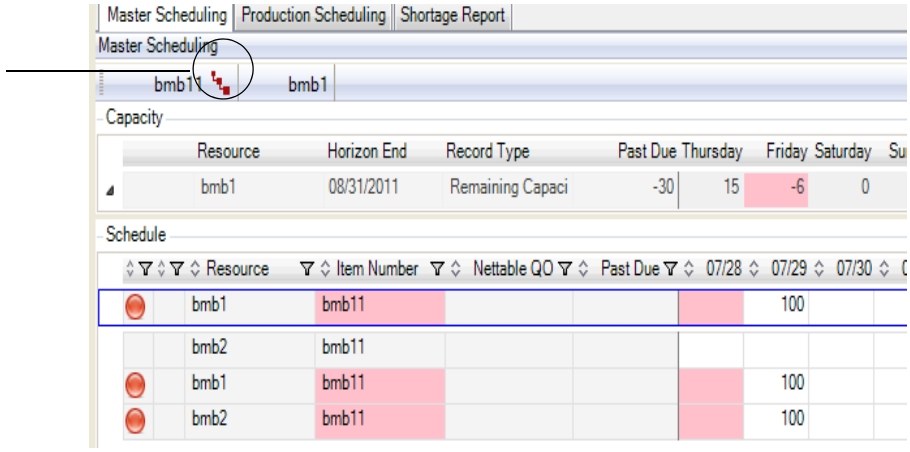
Previously, to make changes across all product structure levels, schedulers typically had to go through all multi-level planning cycles to make updates. When a product has a bill of materials (BOM) that is two or more levels deep, schedulers had no way to:

- Schedule the increase right away for the parent.
- Quickly determine the demand impact on the dependent lower levels.

Schedulers can use the Product Structure Filter to gauge the impact of the change immediately for all levels of the BOM. The MSW Schedule Grid includes the Product Structure Filter (see Figure 2.21).

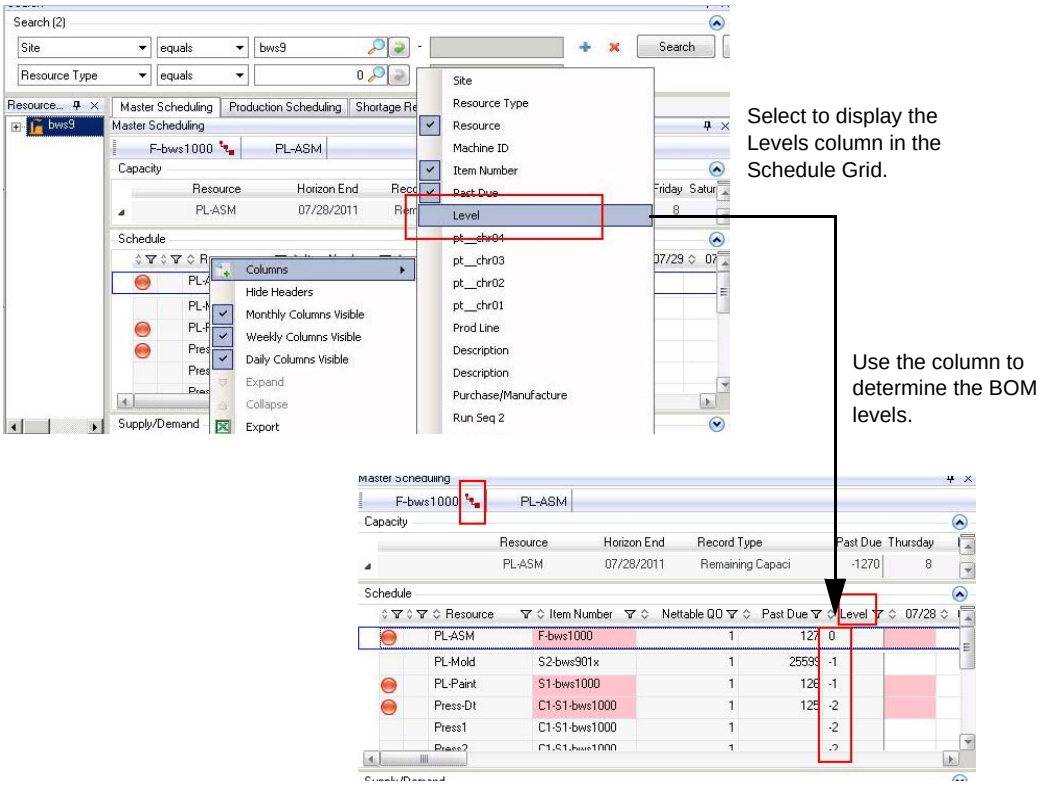
With a single click, schedulers can render all levels of an item—both up and down—within the Schedule Grid. When you click the Product Structure Filter, the filter turns red and the MSW Schedule Grid provides immediate visibility to the QOH as well as the PQOH for each component across the BOM for the scheduled production order, letting you quickly gauge the impact of the change for lower levels. When you click the Product Structure Filter again, the BOM levels are removed from the Schedule Grid.

Fig. 2.21
Schedule Grid Product Structure Filter



To determine BOM levels, you select to display the Levels column in the Schedule Grid by right-clicking on any column header in the Schedule Grid, then selecting Columns, and Levels. When levels display in the grid, you can determine the product hierarchy. A level 0 (zero) is the main item, while a 1 is one upper level, a 2 is two upper levels, and -1 is one lower level, -2 is two lower levels, and so on.

Fig. 2.22
Product Structure Filter Levels



Levels and Search Results

The search process may result in only a subset of BOM components and levels. So, for example, if you search for a finished item and a component item that is five levels down the BOM, you may only see two items that display in the Schedule Grid.

This is because your original search criteria did not include all components and the product structure filter can only display components that are available, based on the criteria you set for the search.

Working with Supply/Demand Panel Data

When the Schedule Grid displays the scheduled quantity for an item, the Supply/Demand Panel displays the remaining open quantity due for the item. Sources of demand can include forecasts, safety stock requirements, sales orders, customer scheduled orders, component requirements from manufacturing, and so on. Sources of supply include nettable QOH, production orders, production/purchase orders, supplier scheduled orders, and so on.

Fig. 2.23
Supply/Demand Panel

When an item is highlighted, the system displays the following associated data in the Supply/Demand Panel:

- POH

  The system displays the real-time projected inventory on hand for the item.

  The projected on-hand calculation includes firm scheduled quantities from alternate resources for the item. So, for example, if you schedule item A on production lines 1 and 2, and item A has:

  - Demand for 100 outstanding
  - A production order for 50 on production line 1
  - A production order for 100 on production line 2

  Then, the system displays a POH of 50 for production line 1.

  The repetitive projected QOH calculation is as follows:

  WO Open quantity + Nettable Inv – Total demand

  Where:

  Nettable Inv = From MRP Detail (23.16)

  Total Demand = Independent + dependent + forecast + seasonal

  WO Open quantity = SNRD

  The POH status for both repetitive and production orders derives from the POH calculation. If any POH for that item is below safety stock, POH status is set to safety stock status. If any POH is < 0, the POH status is set to below-zero status.

  Additionally, the repetitive and production order PAC status derives from the POH calculation. If any POH for that item is below safety stock, POH status is set to safety stock status. If any POH is < 0, the POH status is set to below-zero status.

Past Due (Demand). The system displays past-due totals by demand type.

Note This includes all past-due demand for the item—not just demand from the specified historical period.

Record Type. The following are examples of the types of records that display:

- Independent demand

  The system displays independent demand from QAD EE for the selected item.

  This quantity includes confirmed sales orders, DRP orders, and type 3 (required ship schedule) customer schedules.

  All demand values match quantities shown in MRP Detail Inquiry (23.16).

- Dependent demand

  The system displays additional demand from QAD EE based on dependent demand from parent-level items for the selected item.

- Forecast demand

  The system displays the net balance of current forecast demand from QAD EE for the selected item.

  QAD EE stores forecasts by week. The workbench shows the entire forecast for the week on one day.

The system displays the net balance of current forecast demand from QAD EE for the selected item. Master production scheduling and MRP use the net forecast and abnormal sales order demand to calculate total demand. The net forecast is calculated as follows:

Net Forecast = Forecast – Sales Order Demand

When the shipment forecast is oversold—that is, the quantity sold exceeds the forecast amount—the net forecast will not go below zero.

- Seasonal/safety stock

  The system displays seasonal build quantities as well as safety stock.

  The system performs the following calculation for each date when a master scheduled receipt is due or a seasonal build quantity is made available, causing a net increase in supply. It takes into account all sales order and required ship schedule demand and gross requirements up to the next increase in available supply.

  Master Scheduled Receipt – Sales Orders and Required Ship Schedules – Gross Item Requirements – Seasonal Build Net Increases + Seasonal Build Net Decreases = ATP

- Receipts

  The system displays supply from order receipts, such as production order receipts.

- Production Forecast

  When you establish planning bills and forecast and master schedule at the family-item level, the system automatically calculates the derived demand for components of the family or upper-level item. These calculations are based on the ATP quantities for the family-level item and the quantity per and forecast percentage for the components of that family item. The result is called a *production forecast*, since it derives from the master production schedule and the forecast percentage specified in the planning bill.

- Planned Scrap

  The number of items planned as unusable while producing the quantity.

  Scrapped quantity displays on work order history and cost reports. The total GL cost of the rejected items posts to the scrap account.

Working with Production Orders

MRP generates planned orders, balancing supply and demand; however, when scheduling issues arise, you can manually adjust production order quantity, status, dates, and so on when you need to:

- Reduce the quantity to account for a capacity constraint.
- Increase the quantity by merging production orders into a single order.
- Increase the quantity because of an increase in demand during the scheduling horizon.

Important If you do not do not save your changes, the production order reverts back to its prior condition.

The following topics describe production order tasks that you can perform in MSW.

Scheduling Items

After you select the resource and item, you can make changes to production orders either in the Schedule Grid or under the Production Order Maintenance tab. Within the Schedule Grid you can:

- Update quantities directly in the daily buckets by entering new values.
- Create a new production order by entering the desired quantity.
- Delete an order by overwriting a quantity with a 0 (zero).

Modifying Production Order Quantities

Even though MRP generates planned orders, balancing supply and demand, in some cases, you may need to manually adjust the production order quantity. You can use MSW to do this. You can modify quantities directly in the Schedule Grid in any horizon period.

When you make a quantity change against a production order, the quantity change applies to the entire order, not just a specific operation. For example, if you change the quantity on work center A for operation 10, MSW applies the quantity change to the order and, subsequently, all operations related to the production order in question.

You cannot modify the value in Schedule Grid:

- If the Schedule Grid cell value represents more than a single production order
- If the order is closed

1. Select an item on the Schedule Grid.
2. Modify the value in the quantity column.

   The system validates the quantity change can be made.

   MSW updates all calculations. Color indicators may change.

Note You can also change the quantity using Production Order Maintenance within MSW.

Creating Production Orders

You may need to create a new production order from within MSW. For example, for repetitive scheduling, MRP may create a planned order to cover weeks' worth of requirements; however, you may need to level the supply by entering daily production quantities. For a discrete environment, sales representatives can enter new sales orders into the system, and if the current demand for the sales order exceeds supply, MSW displays a visual indicator depicting the shortage. Since MRP has not run yet, there is no planned production order to firm and so you can decide to create a new order.

Use the following procedure:

1. In the Schedule Grid, for the work center/machine/production line selected, enter a scheduled quantity for an existing item where no production order currently exists.

   The system:

   - Determines the order ID
   - Obtains the default BOM/routing
   - Sets the order status to F for a discrete order and E for a repetitive order

- Calculates operation load

Note The actual scheduling of operation due and start dates occurs after you save the order, while planned orders already have calculated operation load and due/start dates.

- Updates the workbench calculations
- Updates Production Order Maintenance within the workbenches with new data.

2 Use Production Order Maintenance within MSW to complete other fields for the new production order.

3 Click the Save button to save your changes.

You cannot create a production order from the work center resource on the Schedule Grid. The system does not backward calculate work order dates, so the operation date for that work center is the date you specify. For example, if you enter a quantity for date1 on the MSW Schedule Grid, the system creates a work order with a start date of (date1 – x) where x is the number of days for the preceding operations that need to complete. The order would have the operation for that work center on date1.

Calculating Dates for New Orders

When you create a new production order, the system needs to calculate the projected release and due dates of the production order and the operations.

You can select an item/date and enter a new quantity in the Schedule Grid. When you do, the system:

- Sets the due date to a date entered on the Schedule Grid
- Calculates the operation due date of all operations
- Calculates the order release date, which is based on MRP lead time days
- Updates the workbench with the resulting calculation

When you change the due date, the normal duration calculation rules apply. Normal duration is the default setting (MF-LT) for the duration calculation method that you set in the Scheduling tab of user preferences in the workbenches; refer to “Projected Duration” on page 59.

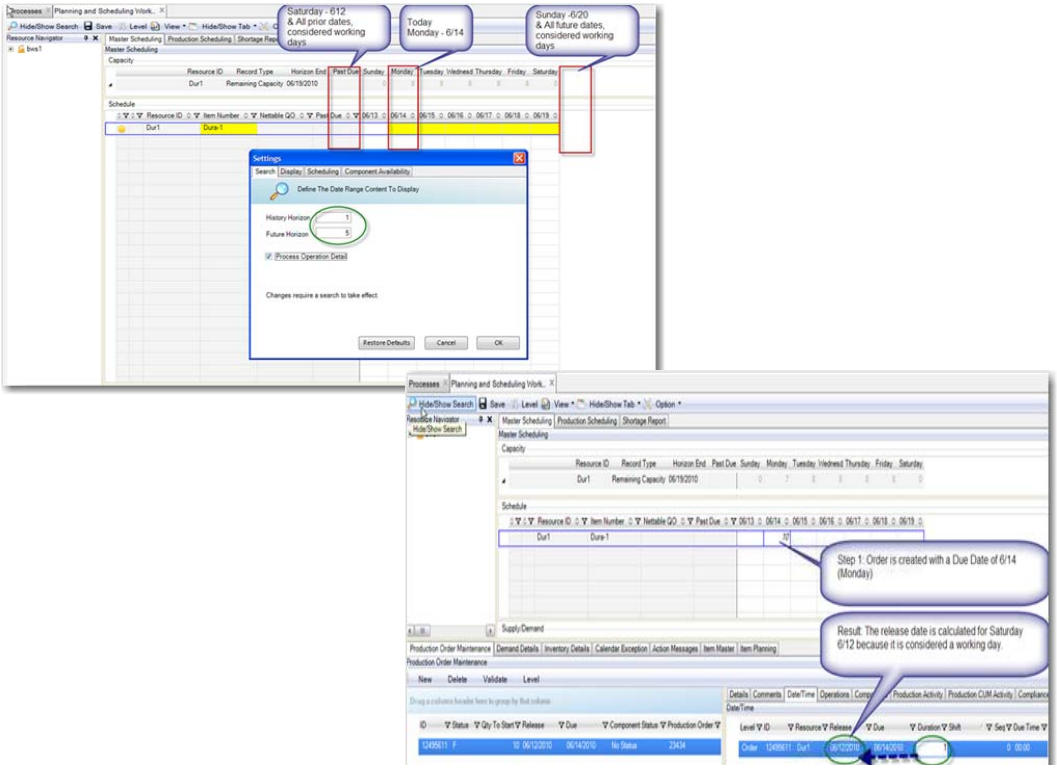
Setting Dates Prior to Horizon Dates

When you create a production order where the production order release date is calculated prior to the History Horizon dates, the system calculates the release dates.

Example Today is Monday 6/14. You set the History Horizon field for one day and the Future Horizon field for five days, then create an order with a due date of 6/14 for an item with a manufacturing lead time of 1 day. The system calculates the release date for Saturday 6/12 because it is considered a working day.

When determining dates in the past, MSW considers working days in the past; however, if you set a date that is beyond the history horizon, MSW treats every day beyond the history horizon as a working day. This also is true for dates beyond the future horizon. The Schedule Grid shows all dates between the start of the history horizon and the end of the future horizon, including working and non-working days.

Fig. 2.24
Example Dates Prior to Horizon Date



Scheduling Discrete Production Orders on a Production Line

You can use Work Order Maintenance (16.1) in QAD EE or the Production Order Maintenance function that displays inside the MSW to schedule a discrete work order on a production line.

To report production, you should use the normal discrete shop floor production reporting programs in the Shop Floor Control menu (16.20). A production order is defined as discrete or repetitive by:

- Discrete order: Type is blank or standard.
- Repetitive order: Type is S(cheduled).

If the item you specify on the order is line scheduled (Pur/Mfg is L) in Item Master Maintenance, Item Planning Maintenance, or Item-Site Planning Maintenance, and the status of the order is not Released or Closed, then the system automatically changes the:

- Production order type to S
- Status to E

Otherwise, for a discrete order the Type is blank, and the Status is F. This occurs when Pur/Mfg code is blank or M(anufactured) for the item.

Modifying Production Order Status

You can manually change production order status to accomplish scheduling goals.

For repetitive environments, a production order can have a P, E, or C status.

For discrete environments, a production order can have a P, F, R, or C status.

You cannot change the status of an order with issued materials or reported production.

To modify production order status:

1. In the Schedule Grid, select an order and modify the order by changing quantity, date, and so on.

   If the discrete order status is P, MSW sets the status to F.

   If the repetitive order status is P, MSW sets the status to E.

   MSW updates all workbench calculations. Color adjustments are made.

2. Click the Save button to save your changes.

Note You can also change the order status using Production Order Maintenance within MSW and update QAD EE records.

Auto-Firming Orders

In many businesses, MRP output is the starting point for master production scheduling. You can use the auto-firm function to quickly adjust orders and expedite your scheduling tasks. For discrete orders, you no longer need to approve planned production orders to change the status to F; for repetitive orders, you no longer need to approve planned production orders to change the status to E. Auto-firming is based on the order due date.

You cannot auto-firm these item types:

- Purchased (items with a P code in Item Master Maintenance (4.1.1)
- Configured
- Routable
- Phantom

You can run the auto-firm process daily in batch mode to avoid missing orders that require a status change.

You can auto-firm orders using programs that are external to the workbenches. The programs firm planned orders for your work centers and production lines for a specific horizon or a range of dates. The program can run in batch mode nightly.

Use the following procedure:

1. Use Batch ID Maintenance (36.14.13) to define a batch ID.

2. Use Batch Request Processor (36.14.13) to run the batch ID you created, or you can use the `qpsbatch` ID that is supplied with the system.

   Note To run the batch daily, ensure that you set Repeat Processing to Yes.

3. Use any of the following to auto-firm planned orders:
   - Set Process All Planned Orders in Scheduling Horizon to Yes in Auto Firm Planned Orders (22.13.3).
   - Optionally, set a date in the Last Auto Firm field.

Note You must set Auto Firm to Yes in both Production Line Maintenance and Work Center Maintenance if you auto-firm for production line and work center resources. If Auto Firm is set to No in these programs, the system does not firm any planned orders. You can see the Auto Firm field status and the date of the last auto-firm in work center and production line browses in QAD EE.

4 View the firm orders in MSW.

Planned production orders for items scheduled on production lines display as firmed on the primary production line once you auto-firm them. For discrete production orders, that status changes to F. For repetitive production orders, the status changes to E.

Changing Firm Orders Back to Planned

When you change the status of planned order to firmed and then decide that the resulting effect on the schedule is not as expected, you can change the status back from F(irm) to P(lanned) so long as you did not save. The system restores the whole record.

When the order has been firmed and split, you cannot undo the changes. You must delete the order in this case.

Modifying Production Order Dates

You can modify production order header dates in MSW to help you manage the due and release dates of production orders. Use the following procedure:

1 Select the Production Order Maintenance tab within MSW.

2 In the order summary list, modify dates in the Due Date or Release Dates field; see Figure 2.25.

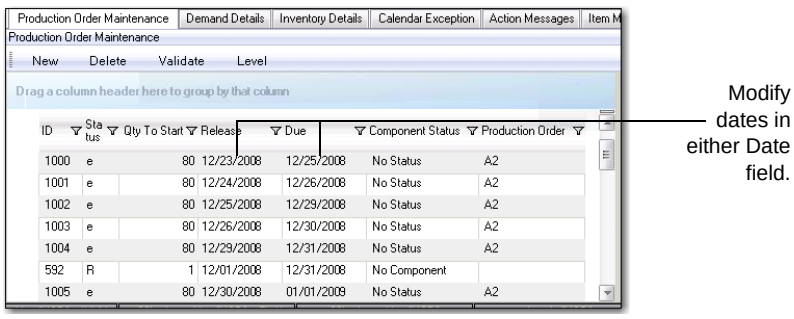
When you modify the due date, MSW updates workbench calculations and other calculations impacted by order due date and quantity.

When a due date is changed, the system changes the corresponding release date so that the lead time from item planning remains the same.

If changing dates for a production line, MSW updates the production line required capacity; if changing dates for a work center, there is no impact.

3 Click the Save button to save your changes.

Fig. 2.25
Production Order Maintenance, Date Fields



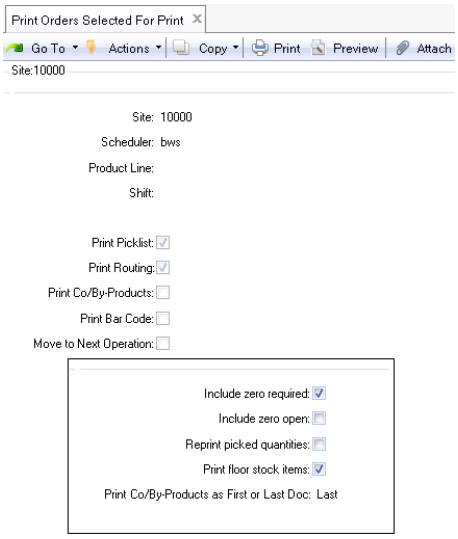
Releasing and Printing Production Orders

You can print production orders from the MSW. To do this:

1. Select orders for print.
2. Save the production orders you want to print.
3. Use QAD EE Print Orders Selected For Print (16.5); see Figure 2.26.

   The orders selected on the MSW/PSW print. The Selected for Print field is cleared in MSW's Production Order Maintenance.

Fig. 2.26
Print Orders Selected for Print (16.5)



Note You can only print released orders with the Print Orders Selected for Print function.

Deleting Production Orders

You can delete a production order from within MSW, using the Production Order Maintenance tab.

You cannot delete an order that has production reported for it.

Use the following procedure:

1. Select the Production Order Maintenance tab within MSW.
2. Select the order from the summary list.
3. Click the Delete button.
4. Click the Save button to save your changes.

Closing and Deleting Scheduled Orders

In repetitive environments, you can use QAD EE Schedule Delete (18.22,2.7) to delete repetitive scheduled orders and their associated work orders, if any. When deleting, Schedule Delete first deletes the repetitive schedule (rps_mstr), then any production orders (wo_mstr) associated with the repetitive schedule.

This process—deleting the repetitive schedule order first, then the associated production orders—does not work, though, when you manually set a scheduled order to C(losed) using Work Order Maintenance (16.1), then try to use Schedule Delete to delete the schedule. This is because when you set the order status to C, the system deletes the repetitive schedule associated with the work order. With the repetitive schedule deleted, the system does not delete the work orders associated with it.

When this occurs, you must delete the work orders associated with the repetitive scheduled order using either:

- Work Order Maintenance (16.1)
- Work Order Delete/Archive (16.23)

Viewing/Editing Order Data

The following topics discuss the data that displays in the MSW. Field explanations are included.

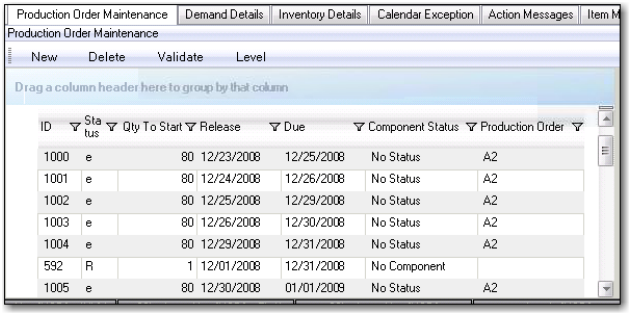
Working with Order Summary List Data

When you select items in the Schedule Grid, you can manipulate order data through two-sided Production Order Maintenance functions. The left side includes a summary list, while the right side includes details.

The summary list starts with orders that have operation due dates on the selected day. To view past-due orders, click the up arrow in the summary list. To show additional records for the current day or for future days, click the down arrow. The sequence in which orders are listed is based on the due date of the order and the production order ID.

You can update some fields directly in this panel. Changes applying to the production order itself update QAD EE when they are saved.

Fig. 2.27
Summary List



Production Order. The production order identifier. This can be the system-generated order ID from QAD EE. If you enter a new order, the system retrieves the next available number from QAD EE or you can optionally enter your own production order value.

ID. A production order lot identifier. The production order number and lot ID work together to identify a specific production order. The same production order can be used with different lot IDs.

St(atus). The current status of the order. With some restrictions—for example, you can only change a firm order back to planned when you have not saved—you can update the status as needed. When you save your changes, the system updates the QAD EE order with the new status.

Release. The date this production order is scheduled to be released to production. The date you enter here changes to the actual release date when you release and print the production order. Release dates also determine the date components are required. Normally components are picked when an order is released.

The system calculates either release or due date, creating, in effect, forward or backward order scheduling.

Due. The due date defaults to today's date plus the manufacturing lead time for the item. The due date is the date this order is due to be completed. This is the date you plan to have product available for shipment to the customer or issue to another manufacturing order. All MRP plans are based on this due date.

Working with Order Detail Records

When you click a cell in the daily supply grid, the system lists production orders for the associated item.

Field explanations are organized by tabs in the Order Detail portion on Production Order Maintenance, starting with the Details tab and ending with the Accounting Data tab.

To quickly add items to production lines while scheduling, use the Production Order Detail tab where resource is a field to view all applicable resources for an item in the drop down.

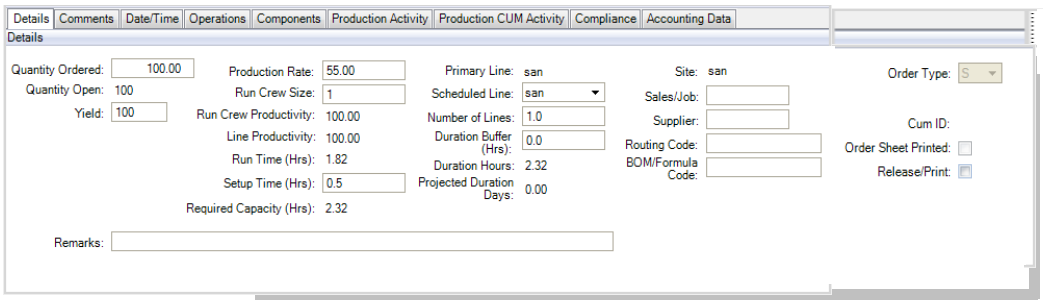
Currently, only shows ones that came in through Search. Maybe show the ones not pulled in by Search, but applicable in a different color.

You can dynamically add items to a line and have the system update production line maintenance with the new item.

Details Tab

The following topics discuss fields in the Details tab. Field explanations are summarized. For full field explanations, refer to the field help for Work Order Maintenance (16.1) for QAD EE.

Fig. 2.28
Production Order Maintenance, Detail Window



Quantity Ordered. The quantity to be produced on this production order, expressed in the item unit of measure.

Quantity Open. This field is display only and shows the scheduled order quantity that the system uses to calculate the duration of a production order. The system uses this quantity to calculate run time.

Yield. Enter the percentage of the number of items built on this production order expected to be in usable condition. Yield defaults from item-site or item planning data.

Primary Line. This field displays whether the line is the primary production line. You set up a primary production line in Production Line Maintenance (18.22.1.1). You can use Production Line Item Update (18.22.1.21) to view primary production lines. You can also update a production line and make it the primary line with Production Line Item Update (18.22.1.21).

Site. The site associated with this production order.

Order Type. This field is display only and depicts the type of order. For most production orders it is blank. In addition to the blank type, other production order types include the following:

- R(ework). No routing. The only item in the bill is the item being reworked. To calculate variances, manually enter bill and routing standards.
- E(xpense). No routing or bill. As with rework orders, enter a bill and routing to calculate variances.
- F(inal Assembly). Generated from sales orders. The standard item-site routing is used. The bill matches the sales order bill.
- S(cheduled). Generated by Schedule Maintenance (18.22.2.1). Not normally processed using Work Order Maintenance (16.1), but they can be changed to standard production orders by changing the status from Exploded to Allocated or to Released. After you do this, the system changes the type to blank. Also, the system updates the repetitive schedule to exclude it.
- C(umulative). Generated by repetitive feedback transactions to collect costs. Not accessed by production order functions.
- W(ork Flow). Generated by Flow Schedule Maintenance when you enter a flow scheduled order that does not reference an existing production order. Not accessed by production order functions.

Scheduled Line. Enter the scheduled line for the order. You can use the drop-down list to select a scheduled line.

Sales/Job. This is an optional code associating this order with a specific sales/production order. For a new order, the default is blank.

Production Rate. Enter the standard run rate for the production line. When you update the value here, the system recalculates the production order run time.

Supplier. The supplier associated with this order.

CUM ID. This field is display only and shows the system cumulative identifier.

Run Time (Hrs). This field informs you of the amount of run time that is required to produce the production order. When you update the production rate, the system recalculates the run time. It calculates the new required capacity (run time + setup time).

The calculation for run time is:

*(Open quantity / Run Rate) * Production Line Productivity% * Run Crew Productivity%*

Where:

*Run Crew Productivity% = 1 + ((WO run crew size – PL run crew size) / PL run crew size) * 100*

Note The system only calculates this if the Run Crew Enabled field is Yes on the production line header record; otherwise, the value is always 100%.

Production Line Productivity% = Shift productivity % if the order is assigned to a shift, otherwise it is a calculated weighted average %.

Run Crew Size. Enter a number that reflects the size of the run crew. The number affects the order run time if you set Run Crew Enabled to Yes on the production line header record. When you update the run crew size, the system recalculates run crew productivity, run time, and required capacity of the production order. The standard run rate is based on a run crew of two people as the standard.

When you change Run Crew Size in Production Line Maintenance, it only affects orders created after that change has been made—not existing orders.

Note You can run a conversion for existing item records to populate the Run Crew Size field. See *Administration Guide: Planning and Scheduling Workbenches* for more information.

Number of Lines. Enter the number of lines/machines the system uses to process the production order. The default is 1 (one). The system uses it to calculate the production order duration by dividing the production run time by the number of lines/machines the production line represents. Changes to this field recalculate duration hours and duration days.

Run Crew Productivity. This field is display only and depicts the percentage of productivity for the run crew.

Duration Buffer (Hrs). Enter the number of hours for the duration buffer. This field also exists in Production Line Maintenance (18.1.1). Changes to this field recalculate duration hours and duration days. You can use this field to add miscellaneous time required to a production order.

Projected Duration Hours. This field is display only and represents the number of hours required to produce a production order. The workbenches calculate projected duration hours as:

(Required Capacity / Number Of Lines) + Duration Buffer

The system overrides the standard duration calculation with projected duration when you enable projected duration in the workbenches User Preferences or when you apply it to an order. The standard duration calculation is as follows:

Defaults = ML-LT for planned orders

The system calculates this planned capacity per delta of order release/due dates for non-planned orders when the orders are pulled into the workbench.

Projected Duration (Days). This field is display only and represents the number of days required to produce a production order. If you apply projected duration, the system determines a new order release/due date. When you update any of the following fields, the system recalculates the projected duration:

- Number of Lines
- Duration Buffer (Hrs)
- Run Crew
- Qty Ordered
- Production Rate
- Setup Time

Applying the projected duration in days helps you monitor production activity against the scheduled due date. As the production order is processed and you report against the order (daily), the quantity open is reduced; therefore, the required capacity is reduce. The Projected Duration reflects the current required capacity for the order, providing a projected remaining days the order requires to complete. You can then compare this value to the scheduled due date to validate that the order is on schedule.

Routing Code. This field depicts the routing code associated with the production order. BOM/routing codes default as they do in QAD EE programs.

Order Sheet Printed. Indicate Yes if you want to print the order sheet for this order.

Setup Time (Hrs). Enter the standard time in decimal hours required to prepare the work center to carry out the operation, independent of order quantity.

BOM/Formula Code. The identifier for the BOM/formula. Each BOM/formula consists of a parent and component. BOM/formula identifies the parent, usually an item number that has been predefined in Item Master Maintenance.

Release/Print. Indicate Yes to release or print this order; see “Releasing and Printing Production Orders” on page 53.

Required Capacity (Hrs). Identifies the capacity required or the total required capacity required to fully produce this production order.

Production Rate, Run Crew Size, and Required Capacity

When you change the Production Rate (run rate) or the Run Crew Size fields in the Production Order Maintenance Details tab in the workbenches, the system recalculates the production order required capacity.

The calculation for required capacity is:

Run Time + Setup Time

When you modify the Run Crew Size field, the system recalculates the Run Crew Productivity field value, Run Time field value, and the required capacity of the production order.

The calculation logic is as follows:

- The system verifies whether the field is set to activate the run crew size relationship to the run rate. If No, the run crew productivity remains a constant 100%.
- If Yes, the system calculates the run crew productivity by calculating the difference between the production line standard run crew size and the modified order run crew size and then dividing by the production line standard run crew size to get the percentage value.

Projected Duration

In the workbenches, you have two ways to apply the projected duration to the production order:

- Automatically

  The system applies order duration automatically when you modify any field on the work order that recalculates an order's required capacity and/or projected duration hours. This includes such fields as Quantity Ordered, Production Rate, Run Crew Size, Setup Time, Number of Lines, and Duration Buffer in the Details tab of Production Order Maintenance in the workbenches as well as in Production Line Maintenance.
- Per user action in the workbenches grid

  The system applies order duration when you change production order status from P(lanned) to any other status.
- When you right-click on a production order in the grid, and the system displays options to Calculate Release Date or Calculate Due Date from the pull-down menu

When the system calculates the order release and due date, the calculations are based on actual, not planned, input values for each production order. These calculations are only applicable within the workbenches and do not apply to planning/scheduling QAD EE functions outside of the workbenches.

The system calculates the production order dates based on User Preference settings:

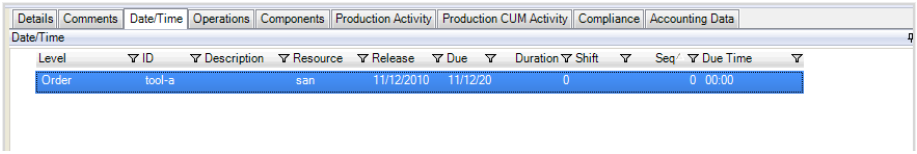
- When User Preferences indicate to calculate the release date, the following rules apply:
  - From the order due date, working backward, the system determines the required release date by taking the projected duration hours and factoring in the available capacity hours in each working day until projected duration hours are met.
  - When the calculated release date pushes the release date in the past, the system sets the release date to today.
  - When the order release is in the past, the system sets the order release date to today and instead recalculates the due date of the order.
- When User Preferences indicate to calculate the due date, the following rules apply:
  - From the order release date, working forward, the system determines the required due date by taking the projected duration hours and factors in the available capacity hours in each working day until projected duration hours are met.
  - When the system calculates the order due date to a date beyond the future horizon, it sets the order due date equal to last day of the future horizon.

The system uses the method you specify to use for calculations through the Scheduling tab of the Preferences window; see “Order Duration Calc Method” on page 38.

Date/Time Tab

The following topics discuss fields in the Date/Time window.

Fig. 2.29
Production Order Maintenance, Date/Time Window



Level. This field displays either the order or operation.

ID. The routing operation number from the QAD EE production order routing detail record. If you create a new production order, the system determines the operation based on the routing. In addition to operation number, it can also refer to the production order number at the order level row.

Resource. The work center or production line identifier.

Release. The date this routing operation is scheduled for the item release. It can also refer to the production order release date when at the order level row.

Due. The date this routing operation is scheduled to complete work on this order. It can also refer to the production order release date when at the order level row.

The system validates that this date falls within the overall scheduling horizon defined by Historical Schedule Days and Future Schedule days in the site Configuration record.

Duration Days. The time, in days, between the release date and due date. Duration is calculated only at the order level and takes into account working and non-working days in its calculation. This is a decimal field that you can update.

Shift. This field depicts the shift defined for the resource. Shift schedules define how many days a week and how many hours the work center or production line is run. When you change the shift, it may change the production productivity percentage, which in turn may change the production order required capacity, and ultimately, change the projected duration days and hours.

Seq. This is the production sequence for the order. This fields tells the system in which order to process orders as part of the production schedule that you create in PSW. You can set the Sequence value here manually, set it within PSW manually, or use the drag-and-drop method in PSW to set it.

Due Time. Optionally enter the time of day that this order should be completed.

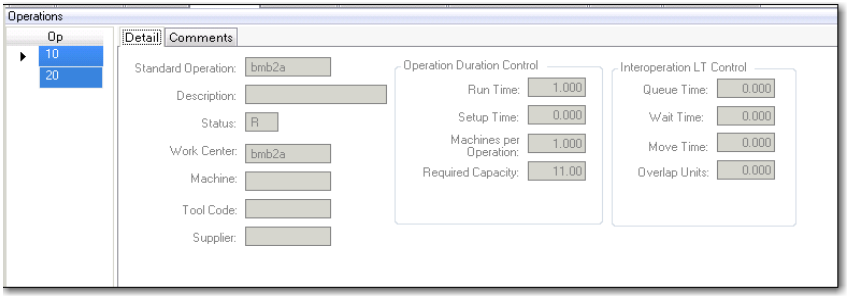
Enter the time in HH:MM:SS format based on a 24-hour clock. For example, enter 1:30 pm as 13:30:00.

This field is for reference. It appears on some reports and inquiries, and can be used to introduce a greater level of detail into the sequence of activities on a production line.

Operations Tab

The following topics discuss fields in the Operations window. Only those fields not previously described for other MSW windows are described. You cannot change values in the Operations fields.

Fig. 2.30
Production Order Maintenance, Operations Window



Op. The number identifying the operation in the routing or process.

Standard Operation. The valid standard operation code that identifies a process operation common to several products or applicable to different routings in different sequences.

Status. This field displays the production order status codes correspond to stages in the order's life cycle:

- Planned
- Firm planned
- Batch
- Exploded
- Allocated
- Released
- Closed

The status of an order determines how much control you have over its bill, routing, inventory allocations, inventory transactions, and labor feedback. An order progresses from one status code to the next and, unless prematurely released, does not return to an earlier status.

Work Center/Machine. A valid work center identifier for an individual machine, group of similar machines, or subcontract supplier. Work center and machine code work together to identify a work center, which is a basic production unit used in manufacturing and control.

Tool Code. Optionally, enter the code for a tool normally used during this operation. This is for reference only. To standardize tool codes, set them up in Generalized Codes Maintenance (36.2.13) for field ro_tool.

Setup, Run, and Move Time. Enter the standard times, in decimal hours, to process items during this operation. Run time is per unit; setup and move time are independent of order size.

Machines per Operation. The number of machines per operation. As the number of machines increases, work center capacity and the number of hours a work center is available for work also increase. The number of machines per operation is also used for calculating the lead time and machine burden cost for an operation.

Queue Time. The standard time, in decimal hours, a production order normally spends waiting at this work center before it is set up and processed.

Wait Time. The standard time in decimal hours that a production order normally spends waiting at this work center after processing has completed.

Overlap Units. The number of units that must be completed at this operation before work can begin at the next operation.

Components Tab

When you click the Components tab, you can view a summary list of components for the order, then view supply/demand summary, supply/demand detail, and inventory detail by site data.

Note The components you view only go one level down in the BOM, except for phantom items where the system displays components in the BOM until it finds a non-phantom component.

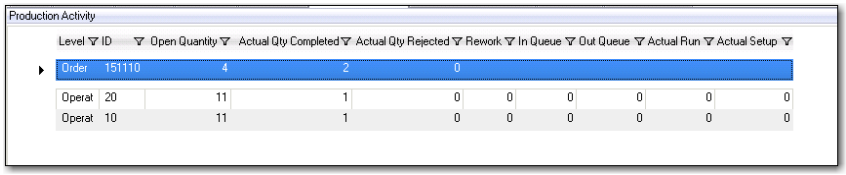
This information is useful when you use the Component Availability Check features; for more information, see “Component Availability Check (CAC)” on page 89.

Production Activity Tab

Use the Production Activity window to track production order activity. For an order, you can view the operation and description, open completed, rejected, and reworked quantity; the actual run time; and the actual setup time. The actual time shows the time required to manufacture a single unit. Run time for an operation is a function of total run time, work center or shop calendar hours, and the machines per operation. Run time is expressed in terms of an hourly production rate.

This time is differentiated expected run time. The actual time is the time required to set up a resource.

Fig. 2.31
Production Order Maintenance, Production Activity Window



Production CUM Activity Tab

Use the Production CUM Activity window to track cumulative order activity. For an order, you can view the CUM ID, the quantity processed, rejected, or in the reject queue; the number scrapped, reworked, and the number in and out of the queue. You can also see the actual run time and the actual setup time.

Fig. 2.32
Production Order Maintenance, Production Cum Activity Window

Production CUM Activity

Level	Cum ID	Open Quantity	Actual Qty Completed	Actual Qty Rejected	Rework	In Queue	Out Queue	Actual Run	Actual Setup
Order		4	2	0					
Operat	20	11	1	0	0	0	0	0	0
Operat	10	11	1	0	0	0	0	0	0

Compliance Tab

Some features of production orders are affected when you use the Regulatory Attributes module. When you set the Compliance Active field to Yes in Regulatory Attributes Control (1.22.24), you can assign batch numbers, restrict items issued to an order, restrict items received, and enforce stricter lot/serial control rules. The Compliance window of the workbenches lets you view Regulatory Attributes data.

Note You should have the Compliance module installed and enabled. When you do not, you can still update the values in the Compliance Tab fields; however, your changes do not impact system processing. The system does store the updated values on the work order master table.

The following topics discuss fields in the Compliance window. Only those fields not previously described for other MSW windows are described.

Assay Percentage. The presence, absence, or quantity of one or more components, usually expressed as a percentage.

Grade. Identifies the quality or physical properties of an inventory quantity. Graded products include raw materials, intermediates, and finished goods.

Expire Date. The expiration date for items that eventually spoil, and for pharmaceuticals that lose potency over time.

Receipt Status. The default receipt status for the order.

Active. Indicates whether the inventory status code entered in Receipt Status should override status assigned in item, site, and location data.

Batch. An arbitrary number for tracking a quantity scheduled to be produced or in production.

Single Lot. Determines whether each receipt from a production order should be assigned to a single lot. This is a default setting you can change at receipt.

Lot Number. The lot number for this production order. Enter a lot number in this field.

Accounting Data Tab

The following topics discuss fields in the Accounting window. Only those fields not previously described for other MSW windows are described.

WIP Account. The general ledger account code used to track work in progress (WIP) inventory values for the order.

Material Usage Var. Material usage variance is calculated as the difference between the actual and expected quantities issued, extended by the cumulative order operation component cost. The expected issue quantity is the cumulative order operation standard quantity required per unit multiplied by the quantity processed at the operation.

Material Rate Var. When you issue components to a production order, material costs post to WIP as the quantity issued and multiplied by the GL cost of the material. Rate variance is calculated as the difference between the GL cost of materials used and the GL cost of materials required.

Subcontract Usage Var. Usage variance is an efficiency variance, calculated as the difference between the subcontracted quantity received and the standard subcontract quantity needed to make this order quantity complete.

Subcontract Rate Var. Rate variance is calculated as the difference between the order cost and the standard subcontract cost.

Mix Variance Acct. Mix variance is calculated as the difference between the standard or expected quantity and the actual quantity received, multiplied by the GL cost of the item.

Floor Stock Account. The GL account code used to track WIP stock adjustments for bulk issue items on this order.

Item Specific Information

The following topics discuss the types of items with which you can work in MSW and explains item data that is presented in MSW.

The system displays a Schedule Grid including each item that can be produced on the selected resource—sorted by item number, scheduled due date, or item status—including the current quantity on hand and any past-due quantity. Vertical scroll arrows let you display additional items.

Note Items without supply/demand are not included in the workbench.

Color coding in the item field reflects the highest-priority situation for a day within the firm scheduling period. For example, if the projected on-hand for the item is negative for one day in the period, while another day's quantity is just less than safety stock, the item number cell is shaded red to reflect the more critical issue versus yellow for the less critical issue of being below the item's safety stock level.

When you select an item in the Schedule Grid, the system provides you with supporting information related to the resource and item combination in the form of several types of item and production information, as well as messages related to status indicators and sources of demand.

Additional Workbenches Tabs

The following topics describe the type of data you can find in browses that are in these tabs:

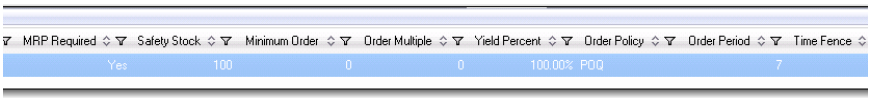
- Item Master and Planning Tab
- Inventory Details Tab
- Calendar Exception Tab
- Sales Quantity By Month Tab (only available in EE versions)

- Seasonal Build Tab
- Holidays Tab
- Intersite Demand Tab

Item Master and Planning Tab

This section explains fields in the Item Master tab. Only those fields not previously described for other MSW windows are described.

Fig. 2.33
Item Planning Window



MRP Required	Safety Stock	Minimum Order	Order Multiple	Yield Percent	Order Policy	Order Period	Time Fence
Yes	100	0	0	100.00%	POQ		7

MRP Required. The current value of the system-maintained MRP Required field in the QAD EE item master or item-site record. When this is Yes, the system has detected a change in such things as product structure, inventory, or transactional records that requires the item to be replanned.

Safety Stock. The safety stock quantity for the selected item defined in QAD EE item-site or item master records.

Minimum Order. The minimum quantity that can be placed on a single order for this item, as specified in QAD EE item-site or item master records.

Order Multiple. The order multiple specified for the item in QAD EE item-site or item master records. When Order Policy is POQ (period order quantity) or LFL (lot for lot), MRP rounds net requirements for the item up to the next multiple of this number.

Yield Percent. The yield percentage specified for the item in QAD EE item-site or item master records.

Order Policy. The order policy specified for the item in QAD EE item-site or item master records. This value determines the method MRP uses to plan orders for this item.

Order Period. The order period specified for the item in QAD EE item-site or item master records. This is the length of the planning period MRP uses when Order Policy is POQ (period order quantity).

Time Fence. The time fence specified for the item in QAD EE item-site or item master records. This is the number of days inside of which MRP does not replan this item.

Safety Time. The number of days of safety time specified for the item in QAD EE item-site or item master records. MRP adjusts actual need dates by this value as protection against late deliveries.

Manufacturing Lead Time. The manufacturing lead time defined in QAD EE Item-Site Planning Maintenance (1.4.17) or Item Master Maintenance (1.4.1).

Cumulative Lead Time. The total cumulative lead time for the item from QAD EE item-site or item master records.

Buyer/Planner. The user ID of the buyer/planner specified for the item in QAD EE item-site or item master records.

Purchase/Manufacture. The code indicating how this item is typically processed by the system. This code controls how the system explodes forecasts, plans and creates orders, and calculates costs for the item. It affects MRP and DRP.

Phantom. This field indicates whether an item is normally stocked or simply put together as part of a higher level assembly. When Yes, the item and its product structure are phantoms, typically used for transient assemblies or intermediate products.

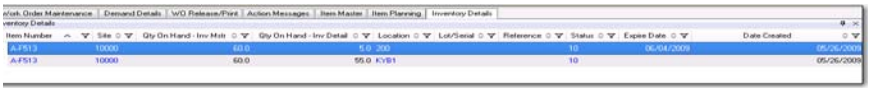
Order Quantity. The standard production quantity defined in QAD EE item-site or item master records.

Alternate. An alternate item should the original item become unavailable.

Inventory Details Tab

Use the data in the Inventory Details window to help you track attribute information entered on production orders. This helps you control the tracking of materials through manufacturing and into inventory. This section explains fields in the Item Details tab. Only those fields not previously described for other MSW windows are described.

Fig. 2.34
Inventory Details Window



Quantity On Hand - Inv Mstr. The current on-hand inventory balance for the item from the inventory master table.

Quantity On Hand - Inv Detail. The current on-hand inventory balance for the item from the inventory detail table.

Expire Date. The expiration date associated with this specific inventory quantity. The system calculates this date when an item is received into inventory.

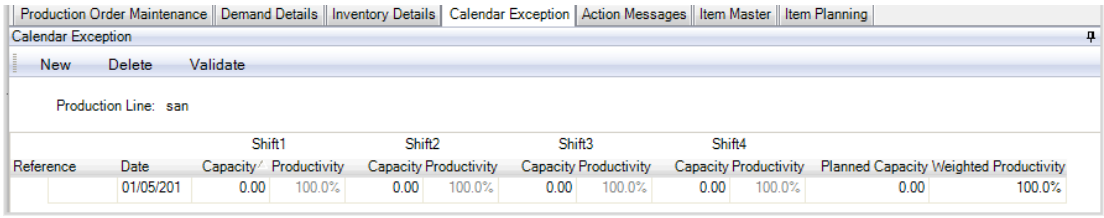
Calendar Exception Tab

Use the fields in the Calendar Exception tab to review or change calendar exceptions. You set up the calendar in QAD EE Calendar Maintenance (36.2.5). When you do, you specify a reference, such as downtime, and the number of hours per day affected. This information displays in the Calendar Exception tab within MSW.

In the Calendar Maintenance tab within the workbenches, you can create a new calendar exception, save an exception, or validate an exception. When you click New, the system fills in zeros for each shift; see the following figure.

When you click Validate, the system verifies that the data in Calendar Exception is correct; it also makes the data available for use in the workbenches.

Fig. 2.35
Calendar Exception, New Exception

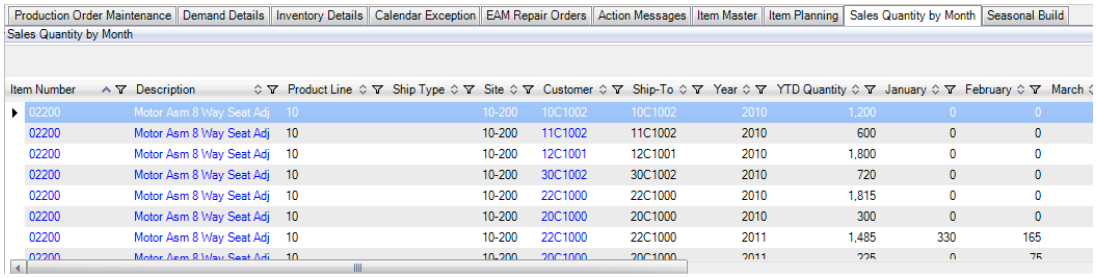


You define shifts in Shift Maintenance (18.1.22) for the production line. For each production line, Calendar Exception displays the reference, date, the capacity (in decimals), and the percentage of productivity for each shift. It shows the planned capacity and weighted productivity for the production line, too.

Sales Quantity By Month Tab

Using the fields in the Sales Quantity By Month Tab you can track sales history data by viewing the items, product lines, ship type, site, customer, ship-to, year, and year-to-date quantity. The panel displays quantities in a month-by-month grid so that you can track invoiced sales orders.

Fig. 2.36
Sales Quantity By Month



Item number/Description. The ID and description of the consignment item.

Product line. The product line for the consignment items. You use Product Line Maintenance (1.2.1) to tailor consignment accounts for items that belong to a particular product line. When you do not define specific product line accounts, the system uses the default GL accounts from Domain/Account Control.

Ship type. Enter the ship type for the consignment order. Shipping consigned inventory uses the same process as shipping non-consigned inventory.

Note The difference between shipping consigned and non-consigned inventory is in the booking of transaction history and accounting. You own consigned inventory until the customer notifies you that it is consumed.

Site. The site of the consignment order.

Customer. The customer ID for the consignment order.

Ship-to. The ship-to address for the customer. When orders are shipped, the system transfers inventory to the location representing the customer.

Year. The year for the consignment order.

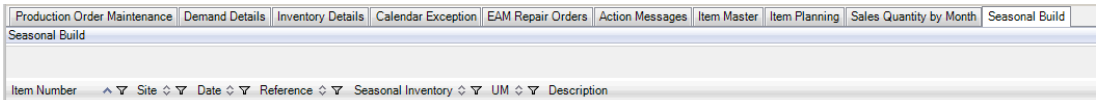
Year-to-Date Quantity. The accumulated consignment item quantities for the year to the current date.

Seasonal Build Tab

Use the fields in the Seasonal Build tab to review sales quantities for items that fluctuate according to some seasonal factor, such as weather or the way a firm handles its operations. For products with seasonal demand cycles, you may need to build up inventory in advance of periods of peak demand. You can do this by viewing the orders and items by site. The date is the end date by which you need items in inventory, while the seasonal inventory is the quantity needed by that end date.

Note The system regards seasonal build quantities as real demand.

Fig. 2.37
Seasonal Build



Item Number. The item number of the seasonal-demand order.

Site. The site the seasonal build applies to.

Date. The end date by which you need items in inventory and a seasonal inventory quantity needed by that end date.

Reference. Any additional information about the seasonal order.

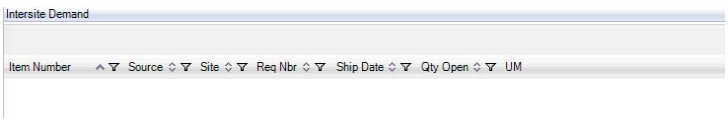
Seasonal Inventory. The quantity needed by the date. Setting the seasonal inventory quantity to 0 (zero) for December 1st indicates that the seasonal build requirement is complete. This means that the item is now included in ATP calculations and is considered a source of supply by MRP.

UM. The unit of measure for the item.

Intersite Demand Tab

Use the fields in the Intersite Demand tab to view demand information from distribution requirements planning (DRP) intersite requests. DRP balances supply and demand for items transferred between sites. The transfer of demand from the site receiving the items (receiving or demand site) to the site supplying the items (shipping or supply site) is facilitated through the generation of intersite requests. DRP calculates distribution item requirements, generates intersite requests, and manages shipment schedules and transportation. Use the workbenches tab to review information to schedule items for the intersite demand.

Fig. 2.38
Intersite Demand Tab



Item Number. The item number of the seasonal-demand order.

Source. The site that supplies the item when demand exists at the receiving site.

Site. The site the seasonal build applies to.

Req Nbr. The intersite request number.

Ship Date. The system uses ship dates set up in Shipping Schedule Maintenance, in coordination with receiving days and load, transit, and unload lead times defined in Transportation Network Maintenance, to calculate default ship dates for intersite requests. When a shipping schedule is not defined, the ship days from the transportation network are used instead.

Qty Open. The open quantity on the intersite request.

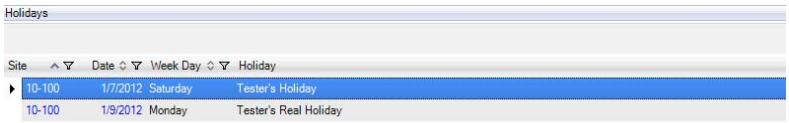
UM. The unit of measure for the item of the DRP intersite request.

Holidays Tab

Use the fields in the Holiday tab to view data for holidays and other non-work days that apply to an entire site. This helps you schedule effectively.

Holidays are days that no one works; the plant is shut down and no production is scheduled. Manufacturing orders are never due and operations are not scheduled on a holiday.

Fig. 2.39
Holidays Tab



Site. The site the seasonal build applies to.

Date. The date of the holiday.

Weekday. The day of the week of the holiday.

Holiday. The name of the holiday.

Saving Your Changes

To save modified and new production orders to QAD EE, click Save.

You can make changes across items or sites in the workbench without saving first. You should save, though, before you run a new search when you want to save existing changes to the database before retrieving data from the new search.

Chapter 3

Production Scheduling Workbench (PSW)

The following topics describe how to use the features of Production Scheduling Workbench (PSW).

Introduction 72
Introduces the PSW, components, and features.

Enabling PSW 74
Tells you how to enable PSW for a site.

Accessing PSW 74
Provides procedures to access the PSW in the .NET UI.

Set Up 74
Tells you how to synchronize tables, mass set up production lines, then mass update the setup.

PSW User Preferences 75
Describes user preferences for PSW, including field descriptions for all user preferences

Processing PSW Schedules 78
Provides a general procedure to create and process a production schedule and describes processing results.

Working with Sequence Grid Data 79
Describes various ways to manipulate dates, data, and other items within the PSW Sequence Grid.

Dispatching and Printing 85
Provides instructions to dispatch and print PSW-built schedules.

Introduction

Use the Production Scheduling Workbench (PSW) to prioritize/sequence production orders within a day and, optionally, a shift. You can use the PSW to view and update production line schedules used with the QAD EE Advanced Repetitive module.

Note Operation-based scheduling and work center production scheduling are not available in the PSW in the current release.

Features

Using PSW, you can build production schedules with full knowledge and visibility of resources, production orders, items, the shop floor, and more. Besides just scheduling items, you can:

- Determine production order status and whether they are sequenced or nonsequenced.
- Determine production progress by displaying shop floor activity
- Define the sequence horizon and configure the display.
- Modify orders and order quantities.
- Create, delete, copy, and split production orders.
- Modify production order status or duration.
- Calculate order dates.
- Define defaults, shifts, and sequences.
- Sequence/unsequence production orders.
- Dispatch production to the shop floor by printing dispatch lists, picklists, production orders.

Drag and Drop

You can easily modify aspects of a production order by dragging and dropping production orders within the PSW Sequence Grid and from Production Order Maintenance to the Sequence Grid. When you drop an order onto another order, the order you drop acquires the properties of the receiving order, so, for example, if you drag and drop an unsequenced order onto a sequenced order, it becomes a sequenced order. Use the drag-and-drop method to:

- Change due dates by dragging and dropping a production order from one release date to another production order with a different release date.
- Change status by dragging and dropping a selected order. When you do, PSW updates the production order status to F if the status is P.
- Modify resource capacity by dragging and dropping from the source to the target destination after you select a single or multiple production orders.
- Sequence production orders in PSW by dragging and dropping single or multiple orders after a sequenced production order. Once you drop the orders, the system assigns the sequence number to the order(s) as greater than the prior sequenced numbers and assigns the appropriate shift number if shifts are being used.
- Unsequence an order by dragging a sequenced order and dropping it after an unsequenced order. The system changes the sequence to 0. When you do not have unsequenced orders, you can unsequence by changing the sequence number to zero.

Quick Find

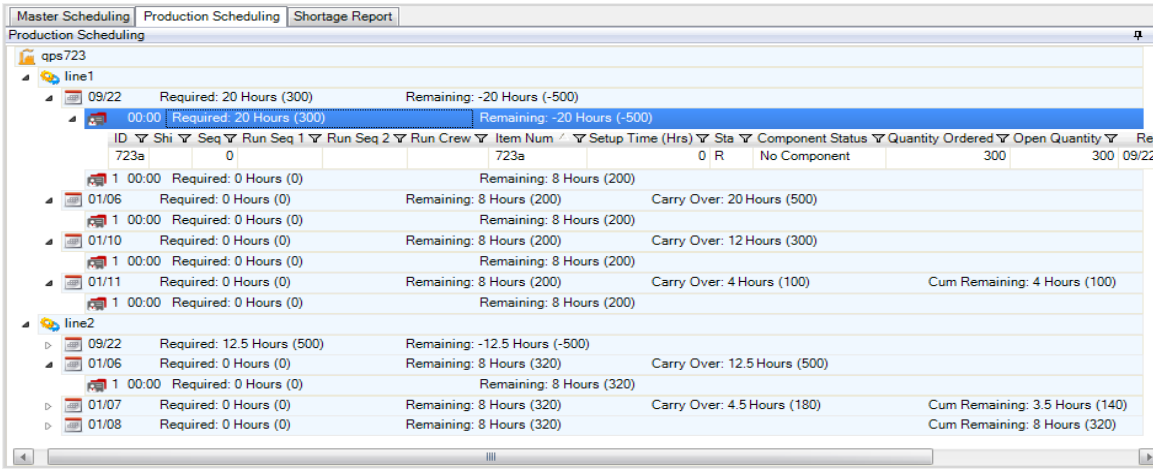
You can use the Quick Find feature in the toolbar to quickly locate orders. You can enter text or numbers in the Quick Find feature, then scroll through records. You can use the Quick Find feature in the PSW, too; however, since the PSW has a shorter window and does not show planned orders or orders with a zero (0) open quantity, this restricts data that displays in the PSW, resulting in limited displayed orders. When you use the Quick Find feature, the order may or may not be visible in the PSW. You should switch to the MSW and find the order using the next/previous buttons.

For more information, see “Quick Find” on page 21.

PSW Workbench Elements

Figure 3.1 displays the PSW workbench. The text following the figure describes how each panel is used.

Fig. 3.1
PSW



Resource Panel

Based on your selection criteria, the Resource Panel displays records that match your search criteria. For detailed information, refer to “(2) Resource Panel” on page 5.

Sequence Grid

The Sequence Grid lets you concurrently view a list of both sequenced and non-sequenced production orders. In the Sequence Grid, you can view sequenced and non-sequenced orders that you move from Production Order browse. Production Order Browse lets you view all sequenced and unsequenced orders across the board.

The Sequence Grid displays item supply records—that is, production orders—with daily bucketed quantities of the production order supply records for the item. The quantities shown within the Sequence Grid are production order quantities.

PSW shows capacity in hours and units. The unit reflection is for required capacity; that is, that x units are needed per the schedule. There is also a unit reflection for remaining capacity; that is, you can produce x more units based on the current schedule entered for the release date. In the PSW, the unit that displays is based on an average. There are two types of values for hours that display: one pertains to remaining capacity, while the other pertains to required capacity.

You can add columns to the PSW Sequence Grid as well as add or modify column header labels, using QAD EE standard label maintenance programs.

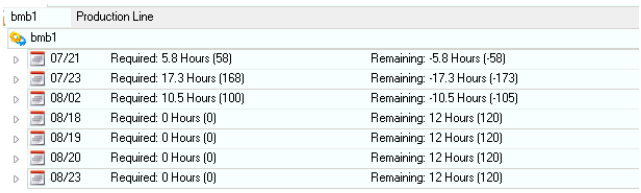
Supporting Data/Information Tabs

Similar to the MSW, additional data/information for production orders and items is provided in various supporting tabs that display at the bottom of the PSW. For information on updating data or field descriptions in these windows, refer to “Common Features” on page 9.

Sequence Horizon

The sequence horizon determines the number of sequencing daily buckets that show in the PSW. If the horizon is three days, for example, then you see today plus two more days in the PSW. Past due orders always display in the Sequence Grid even if they are not within the current sequencing horizon. For information on setting the sequence horizon, see “Defining PSW Sequencing Horizon” on page 75.

Fig. 3.2
Sequence Horizon



Enabling PSW

You must enable PSW by setting the Use Plan/Sched Workbenches field in Site Maintenance 1.1.13); see “Enabling the Workbenches” on page 28.

Accessing PSW

You access the PSW through QAD .NET UI. You can enter either of the following in .NET UI Applications field. to access the PSW:

- Master Scheduling Workbench, or part of this name
- Production Scheduling Workbench or part of this name

Set Up

You should perform the following setup steps before you begin scheduling in the workbenches:

- “Synchronize Resource Tables” on page 29.
- “Set Up Production Lines” on page 30.

PSW User Preferences

The following topics discuss the following setup parameters for PSW:

- Defining PSW Sequencing Horizon
- Configuring Schedule
- Defining Defaults

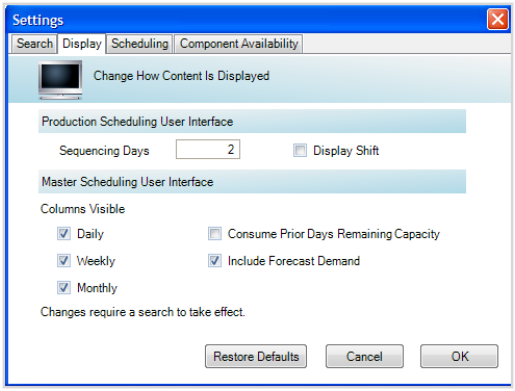
Defining PSW Sequencing Horizon

The PSW horizon setting is based on calendar days, not the shop calendar. Regardless of their status, past due production orders on the production schedule that have not been completed by the current date always display. Past due production orders do not have to be in status Released to show on the PSW.

For manageability, the PSW should contain a small data set so that you can easily view and manage production lines, release date buckets, and release date details. So, for example, if you set the horizon for one day, you can see all production lines and easily schedule from one to ten lines in a single view. You can also see the production schedule across several production lines.

You define the sequence horizon dynamically through the Options pull-down menu. You select Option, then Preferences, then the Display tab to set the sequence horizon.

Fig. 3.3
Settings Window, Display Tab



Sequencing Days. Enter the number of days for the sequence horizon. When working on a production schedule, the typical horizon is 24 hours to 5 days.

During production sequencing—that is, prioritization of production orders within the sequence horizon—you can view supply and demand, and any potential issues for sequence schedules, then drill down to determine the problem and possible resolutions.

Display Shift. Set this field to Yes to display shifts in the Sequence Grid. Shift buckets display:

- When orders exist for the item/shift/release date
- When capacity exists for a shift.

Note The shift still displays when its remaining capacity is zero or less than zero because when remaining capacity is zero or less than zero, production orders have been scheduled against that shift and therefore, display in the PSW. Shifts do not display when no work orders have been scheduled against the shift and the planned capacity for the shift is zero, indicating the shift is not in use.

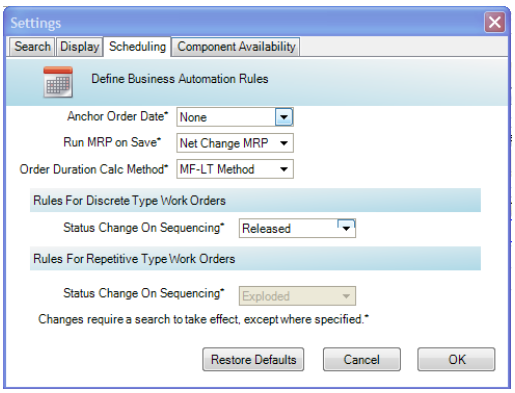
- For standard capacity
- For exception capacity

You set the shift start time in Shift Maintenance (18.1.22).

Configuring Schedule

Use the fields in the Scheduling tab of the Settings window to set options for PSW.

Fig. 3.4
Settings, Scheduling Tab



Anchor Order Date. Enter either None or Due Date to anchor the order date.

None: The system does not anchor dates.

Due Date. Choose Due Date when you want production order due dates to stay intact; for example, when you need to start a production order earlier than planned, but you want the due dates to remain. Anchoring a due date lets you lock in the production order due date so that it does not change during the production schedule process.

Example As the master scheduler, you provide the shop floor with a schedule that shows production orders due by Friday. You must determine upon which date the production orders run, but only the Master Scheduler can change the Friday due date; therefore, you anchor the Friday due date.

Status Change on Sequencing. Indicate the status to which you want to change the order status when sequencing orders. Setting this field for either repetitive or discrete orders managed on production lines helps you to specify order rules. Select from Firm, Exploded, Allocated, Released, and Closed statuses.

PSW Forward Consumption. Specify Yes to consume capacity for future release dates. For more information, see “PSW Forward Consumption”.

Yes: If a production order runs for more than one day, capacity beyond the release date is consumed.

Example A release date of today has a capacity of eight hours. Tomorrow's release date has a capacity of eight hours. You place an order under today's release date, and the order requires 12 hours to run. The PSW release date for today shows 0 remaining hours capacity but the capacity for tomorrow's release date shows four hours.

No: If a production order runs for more than one day, capacity beyond the release date is not consumed.

PSW Forward Consumption

You use the MSW to create a master schedule for the medium-to-long term range—week, month, or longer—balancing demand, supply, and capacity, typically at the departmental level. You use the PSW for the short-term range—one day to few days—sequencing and prioritizing production orders at the production line level. As such, it is critical at the production scheduling level to forward consume capacity when production orders run longer than a day and therefore, require the consumption of future capacity.

With the PSW forward capacity logic, you can see two new columns within the PSW Sequence Grid:

- Carry Over: The sum of load remaining from previous days.
- Cum Remaining: Any excess capacity for that day.

Schedulers can take advantage of the data that displays in these columns. Cum Remaining, which only shows when it is positive, is an opportunity to add load to a shift or release date, while Carry Over is indicative of overloading. So, for jobs that run for more than a day, the apparent overloading is managed by balancing over those days.

Example Available capacity for today's release date is 8 hours. The same amount of capacity of 8 hours is available for tomorrow's release date. You place Production Order A under today's release date and the order requires 12 hours to run. The PSW release date for today shows 0 (zero) remaining capacity and four hours of remaining capacity for tomorrow's release date. When you have 12 hours of load on a day that has 8 hours of total capacity, then, you have –4 hours that show in the Cum Remaining for that day. Those –4 hours plus a carry over—that is, the excess load from the preceding day—display for tomorrow's carry over. When only 4 hours remain on tomorrow, the scheduler realizes than another job that takes only 7 hours and would normally complete, cannot be done tomorrow since there are 4 hours remaining after doing the carry over load. The other balance of 3 hours spills into the day after tomorrow. Figure 1 shows the two new columns in the PSW Sequence Grid.

Fig. 1
PSW Forward Capacity-Related Columns

Defining Defaults

You can define defaults for:

- Shift scheduling behavior
- Sequencing behavior

For shifts, you can enter a blank shift to indicate that production orders do not have a shift.

You can remove the display of shifts though the Options pull-down menu.

Processing PSW Schedules

The following topics describe a generic procedure to produce a production schedule. Specific tasks follow this section.

Procedure

There are many different ways to access resource and scheduling data within PSW, and many different functions that you can perform using the data when creating or modifying a production schedule. The following steps let you perform a complete production order scheduling business cycle from the PSW:

1. From the Search Grid, select Scheduler ID in the first field, equals to in the operator search field, then your user ID in the third search field.

   The system displays records of items related to the Scheduler ID. The system retrieves all transactional, demand, and supply records for items with dates that also match the History and Future Horizon values that you set in the Option Window.

2. If you have a view, you can optionally apply your View.

3. Click on the resource in the Resource Panel.

   Determine which production orders should be released and sequenced over the next few hours or days.

   The production orders may not be assigned to the resource in view; they may be assigned to a default resource. Uses Production Order Browse to find items and production orders that you can move to the selected resource.

4. Schedule items.

   Focus on finalizing the details of the production schedule for your sequencing horizon. In addition to changing resources, dates, or status, you can:

   - Sequence production orders.
   - Schedule using shifts.
   - Drag and drop scheduled production orders.
   - Retrieve the production order in Production Order Maintenance, then:
     - Modify order setup.
     - Align order dates.
     - Create a new production order.

- Delete, copy, or split orders.

5 Monitor a production order by displaying:
   - Order supply summary in the Production Order Maintenance summary list
   - Order details or attributes
   - Production rates
   - Comments
   - Order dates, times, shop floor activities
   - Routing data
   - Inventory details

6 Save your changes.

7 Optionally, export data to a spreadsheet.

8 Report production.

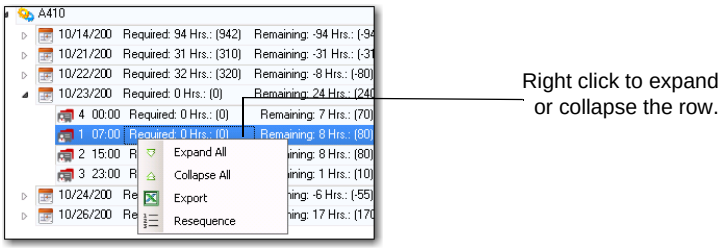
Working with Sequence Grid Data

The following topics explain the data within the Sequence Grid and describes ways that you can interact with the data.

Expanding/Collapsing Data

You can expand or collapse data within the Sequence Grid. To do this, click on the release date header row.

Fig. 3.5
Expand Options



Viewing Capacity

You can view the required capacity and remaining capacity of a production line by release date.

Example For release date 1/1/2011, there are two shifts: 1 and 2. The orders currently placed under the release date consume two hours under shift 1 and three hours under shift 2. The capacity row for the release date is a summation of what is scheduled under the various shifts for the release date in question.

Unlike the MSW, the PSW does not display a Capacity Grid; instead, you view required and remaining capacity at the production line level. This is because you use the Sequencing Grid to manage production orders by release date, not due date. In some cases, the order release/due date are the same, and in other cases, they differ.

When you select a resource from the Resource Navigator, the Sequence Grid displays the production line and a list of release dates, based on the setting of your sequence horizon. For each release date header record, the system displays required and remaining capacity information.

When you expand release date details, the Sequence Grid displays the capacity/required capacity of each shift header record.

Fig. 3.6
Sequence Grid

The following topics explain fields within the PSW.

ID. The valid system production order identifier.

Shift. The production line shift as defined in Production Line Shift Maintenance.

Seq. The production order sequence number.

Run Seq 1, 2. You use run sequence fields as a reference to control the sequence in which firmed orders are sequenced on a production line schedule. When multiple items are produced on a single production line, efficiency can be improved by producing the items in a certain order. Run sequence fields display the attributes of an item; for example, you can have a run sequence of small, medium, or large or white, red, black assigned to your various items.

Item Number/Description. The valid item number and description.

Status. The production order status code. Production order status codes correspond to stages in a production order's life cycle:

- Planned
- Firm planned
- Batch
- Exploded
- Allocated
- Released
- Closed

The status of a production order determines how much control you have over its bill, routing, inventory allocations, inventory transactions, and labor.

Quantity Ordered. The planned quantity of the production order. Compare this with the closed quantity, which is the good quantity reported for the order.

Release Date. The date this production order is scheduled to be released to production. The date you enter here initially changes to the actual release date when you release and print the production order. Release dates also determine the date components are required. Normally components are picked when an order is released.

When you move an order in the PSW from one release date to another, the system changes the release date on the order. The change in release date is reflected immediately on the PSW. The order does not have to be in any specific status for this to happen. Only non-planned orders show on the PSW.

The system calculates either release or due date, creating, in effect, forward or backward order scheduling.

Due Date. The due date is the date this order is due to be completed. This is the date you plan to have product available for shipment to the customer or issue to another manufacturing order. All MRP plans are based on this due date.

Resource. The production line as listed in the Resource Panel.

Site. The site to which the resource belongs.

Modifying Production Order Quantities

You can manually adjust the production order quantity in PSW. When you change the quantity of a production order, PSW applies the quantity change to the entire order, not a specific operation.

1. Select a production order on the Sequence Grid.

   The system highlights the selected production order.

2. Modify the value in the Quantity Ordered column by double-clicking in the cell.

   PSW updates all calculations. Color indicators may change in the MSW.

Note You can also change the quantity using Production Order Maintenance within PSW.

Creating/Deleting Production Orders

Procedures to create and delete production orders are in Chapter 2, “Master Scheduling Workbench (MSW),” on page 19.

Splitting Production Orders

PSW lets you split a production order into smaller production orders while tracking costs to a cumulative order.

To split a new discrete production order into several production orders:

1. Select the production order to split.
2. Right-click to display the pull-down menu.
3. Select Split.

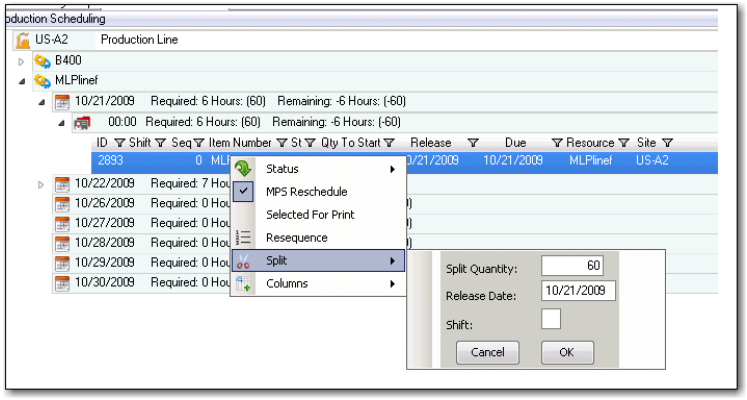
   A window displays additional options; see Figure 3.7.

4. Enter the split quantity, release date, and if necessary, the shift.

5 Press OK.

The system creates a new production order per the data entered in the split pop-up window and reduces the open quantity.

Fig. 3.7
Splitting Orders



Scheduling a Production Order by Dragging and Dropping

For a selected production order, you can drag and drop from Production Order Browse to the Sequence Grid.

1 Select the production order in Production Order Browse.

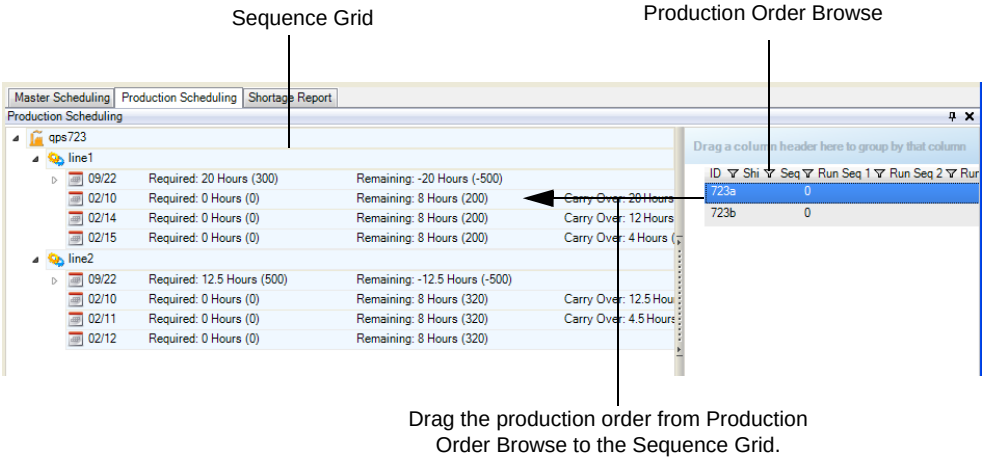
2 Drag the order to the PSW Sequence Grid.

A drop indicator displays, indicating the location at which you can drop the production order.

Note The indicator does not display if the production line target is not defined as a primary or alternate production line.

PSW updates and recalculates data.

Fig. 3.8
Drag and Drop from Production Order Browse



Modify Production Order Status

You can modify the status of one or many production orders easily within the PSW Sequence Grid.

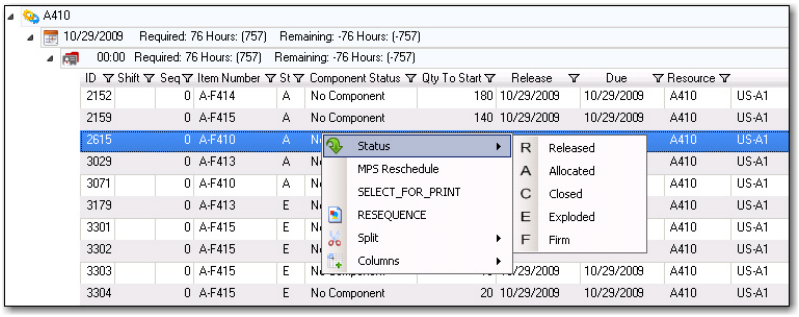
To do this, use the following procedure:

1. Drill down in the Sequence Grid to view orders.
2. Right click, then select Status.

   Note You can hold down the right mouse button to select more than one production order to mass change the status.

3. Select the status for the change:
   - A(llocated)
   - C(losed)
   - E(xploded)
   - F(irm)
   - R(eleased)

Fig. 3.9
Status Change



Modifying Production Order Duration

Occasionally, you may need to manually increase or decrease the production order duration. For example, you may want to expedite a production order and thereby collapse the average duration of the order. Or you may need to expand the duration, starting earlier to complete by the due date.

Production order duration is initially derived from the item manufacturing lead-time or calculated per the required capacity of the production order, factoring resource capacity. Other consideration may influence the amount of time to produce an item, considering:

- Average capacity
- Order quantity
- Operation lead time
- Process time

Production Order Duration can be greater, less than, or equal to the calculated routing duration. To modify the production order duration, use one of the following options:

- Manually update the Duration field in the Date/Time sub-tab in Production Order Maintenance.
- Modify the production order release date only when the due date is anchored; modifying the release dates increases or decreases the duration value.
- Set the Order Duration Calc Method in the Scheduling tab of Preferences, under Option in the top tool bar. This sets the method to calculate the order duration when the order is firmed, created, and modified.

Note You can set the Order Duration Calc Method in the Scheduling tab of Preferences, under Options in the top tool bar. This sets the method to calculate the order duration when the order is firmed, created, and modified (future). When you select a different calculation method from user preferences, the Order Duration Calc Method takes precedence over the standard duration calculation; see"Select the Method for Duration Calculations" on page 38.

Defining Shifts/Sequences

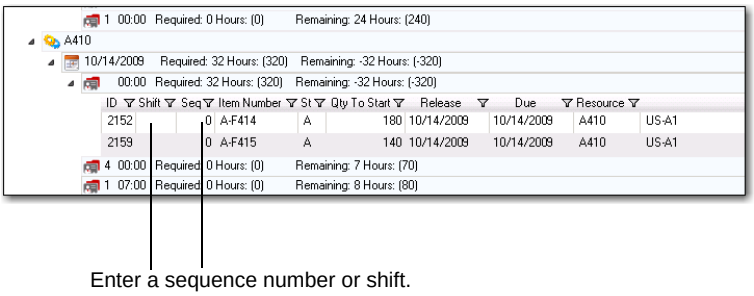
Sequencing determines the order in which manufacturing processes production orders. Within QAD EE, sequenced orders have a unique sequence number that identifies the order as sequenced. Sequencing of production orders is by release date and optionally, shift when shifts are used. Sequence IDs are unique to each shift. Within PSW, the order in which shifts display is based on the shift start time defined in Shift Maintenance (18.22.1.22).

Production scheduling determines the order start (release) date and sequence, and sequencing is by release date in the PSW. The system considers the release date and sequence of the production order to determine which is consumed first.

Note When working with Component Availability Check (CAC), the system prioritizes by order status, release date, then sequence for component consumption. When you have multiple shifts per day and the sequence number repeats within that day, CAC cannot determine the shift. For more information on CAC, refer to Chapter 4, "Component Availability Check (CAC)," on page 89.

To change an order from unsequenced to sequenced or to change an existing sequence number, select a single production order and enter a sequence ID in the Seq field. You modify the shift by entering a shift number in the Shift field.

Fig. 3.10.
Sequence and Shift Field



Once you update the sequence, the Sequence Grid displays the new position of the production order per the specified sequence. If the sequence number you enter is assigned to an existing order, PSW resequences the existing sequenced order number by increasing the number as well as all subsequent orders for the release date.

Dragging and Dropping for Sequence/Shift Changes

You can also select one or more production orders to sequence and drag and drop from Production Order Browse to the Sequence Grid or within the Sequence Grid. Once you drop the orders, the system assigns the sequence number to the orders and assigns as greater than the prior sequenced numbers. The system also assigns shift numbers.

If you change production order release dates, PSW sets the sequence and shift to 0 (zero). You cannot drop an order onto a production line that does not have a release date.

Unsequencing Production Orders

Occasionally, you may need to unsequence a production order, removing the sequence ID and replacing with an unsequenced status, that is, the sequence ID is 0 (zero).

You can do this by:

- Entering a 0 (zero) in the Seq field of the Sequence Grid
- Entering a 0 (zero) in the Seq field within the production order in Production Order Maintenance within PSW.
- Dragging a sequenced order and dropping it after an unsequenced order. The system changes the sequence to 0.

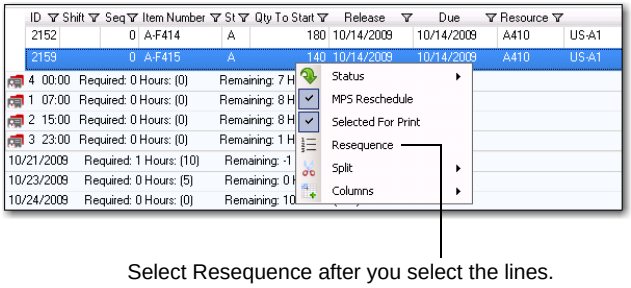
  Note Dragging/dropping after an unsequenced order only works when the order you are dragging is the only sequenced order or you drop that order between two unsequenced orders.

Resequencing Production Orders

Resequencing should happen automatically whenever release date, shift, or production line change on an order; however, occasionally, resequencing does not occur automatically. When this occurs, use the resequencing option in the right-click menu. You can quickly resequence selected orders by right-clicking on a line, then selecting the Resequence option.

When you delete a production order, the system resequences the orders.

Fig. 3.11
Resequence Option



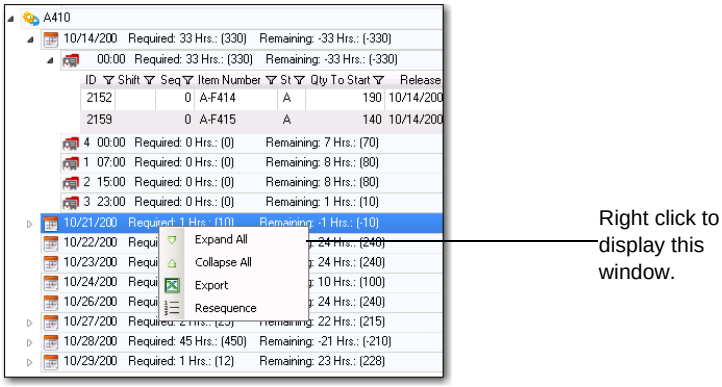
Select Resequence after you select the lines.

Dispatching and Printing

You can publish production schedule data to the shop floor using a dispatch list. To do this, you export PSW data to a Microsoft Office Excel spreadsheet.

While in the Sequence Grid, right-click on the release date row. A window displays options to expand, collapse, export, and resequence. Select Export. When you do, the system opens Excel and creates a temporary spreadsheet file. You should rename the file from Microsoft Office Excel.

Fig. 3.12
Export Window



QAD EE Programs to Use When Dispatching and Printing

You can use two QAD EE browse collections to help you release production to the shop floor:

- Release Production Orders by Production Line
- Release Production Orders by Work Center

You also use the QAD EE Print Orders Selected for Print function when dispatching to the shop floor.

Production Orders by Production Line

Production schedulers can use Release Production Orders by Production Line to quickly determine if the production schedule is viable for the day, week, month, or any specified time period. Release Production Orders by Production Line provides quick answers for production schedulers when they need to know the following:

- Before releasing a work order to the floor, are all components available?
- For production orders scheduled over the next one+ days, are there component shortages?

Release Production Orders by Work Center

Production schedulers can use Release Production Orders by Work Center to quickly determine component availability for discrete work orders for a particular work center. Checking components by work center lets production schedulers know if the production schedule is viable for the week. Release Production Orders by Work Center provides quick answers for production schedulers when they need to know the following:

- Before releasing a work order to the floor, are all components available?
- For production orders scheduled over the next one+ days, are there component shortages?

Select Orders to Release and Print

You use the PSW to select orders to release/print and then use the QAD EE Print Selected Orders for Print function to print the orders.

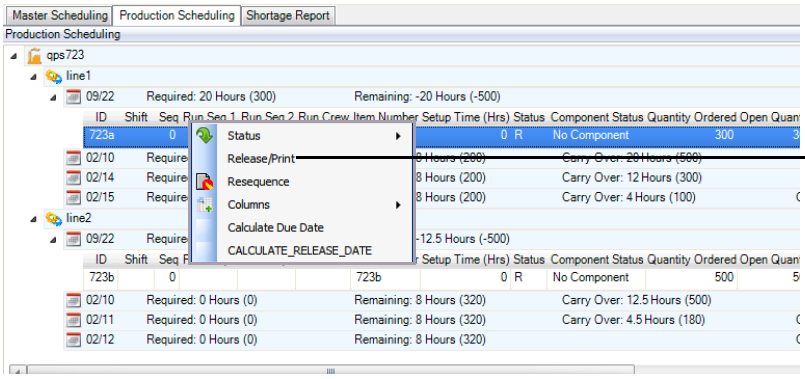
1. In the PSW Sequence Grid, select the production orders to print.
2. Right-click, then select Release/Print.

   The system changes the order status to R(elease) and release/print is selected on the production order.
3. Save your changes.
4. In the .NET Menu Search Panel, type `Print Orders Selected for Print`; then, open the Print Orders Selected For Print program.
5. In Print Orders Selected For Print, select the production line that has the orders you want to print, then set the output to page.

   The system prints the orders, picklist, routing, and so on.

   Note The Print Orders Select For Print program was specifically designed to simplify the print process, letting you print orders that you selected for print from the workbenches.

Fig. 3.13Y
Print Function



Select Release/Print.

Chapter 4

Component Availability Check (CAC)

This chapter presents an overview of the features within the planning and scheduling workbenches that help you check component availability. Specific topics include:

Introduction 90
Introduces the CAC elements and features.

CAC User Preferences 91
Describes user preferences for CAC, including field descriptions for all user preferences.

Use CAC to Schedule Production 94
Prior to releasing production schedules or orders to the shop floor, you can verify which orders have and do not have the necessary materials before releasing them to the shop floor. This section describes how the integrated workbench component checking capabilities can help you determine this.

Use CAC to Check Component Requirements 99
Presents data that lets you use the workbenches to check components for requirements.

Supporting Data 99
Describes supporting data that helps you find the cause of a shortage and find a solution.

Introduction

MSW helps you create a balanced production plan, typically at the departmental level, balancing demand, supply, and capacity. PSW helps you create a production schedule that optimizes use of resources on the shop floor. Before you release a production plan or schedule, you want to ensure that you have enough materials to support the plan/schedule. You can use the component availability check (CAC) capabilities built into the MSW/PSW to do this.

QAD Core Role-Based Browse Collections

Within the QAD EE core programs, you can use the following component check browse collections for real-time retrieval of work order component availability, maintenance, manipulation, viewing, and reporting of production details:

- Manage Materials for Production Line
- Manage Materials for Work Center
- Monitor Material Shortages
- Purchase Direct Materials

The browse collections are discussed in *User Guide: Manufacturing* and outside the scope of component check capabilities within the workbenches that the following topics describe.

Workbenches-Integrated Component Check Capabilities

The workbench-integrated component check capabilities let schedulers and planners use CAC features to ensure that the production orders they plan/schedule have enough materials. They check component availability across a range of production orders and order statuses, then use CAC supporting data to analyze shortages and potential shortages to determine action that needs to be taken, if any.

Both schedulers who use the workbenches and buyers, materials planners, and materials expediters who use the QAD EE Monitor Material Shortages browse collection can use CAC supporting data to analyze the details behind a production order component availability status. Within the MSW/PSW, panels are included that provide supporting data for:

- Component list

  When you select the Component sub-tab within the Production Order Maintenance tab, component information is divided into two parts: the left side displays the BOM list of a production order, including component status, picking and issuing status, and more. See “Component List” on page 100.

- Supply/demand summary

  To get a summary of how the system got to the component status, you can look at the Supply/Demand Summary sub-tab to view all demand and supply related to the component within a site or domain. See “Supply/Demand Summary” on page 100.

- Supply/demand details

  The Supply/Demand Detail sub-tab provides MRP details of the selected component. You can drill down into the details, viewing projected QOH based on supply and demand by date. See “Supply/Demand Details” on page 102.

- Inventory details by site

Use data in the Inventory Detail sub-tab to drill into component inventory detail records for a particular site/location combination to determine options when dealing with component shortages. See “Inventory Details by Site” on page 102.

This chapter is divided into the following sections:

- CAC User Preferences

  Discusses options available when configuring CAC within the MSW/PSW.
- Use CAC to Schedule Production

  Discusses features and procedures for schedulers and planners.
- Use CAC to Check Component Requirements

  Discusses features and procedures for buyers, materials planners, and expediters
- Supporting Data

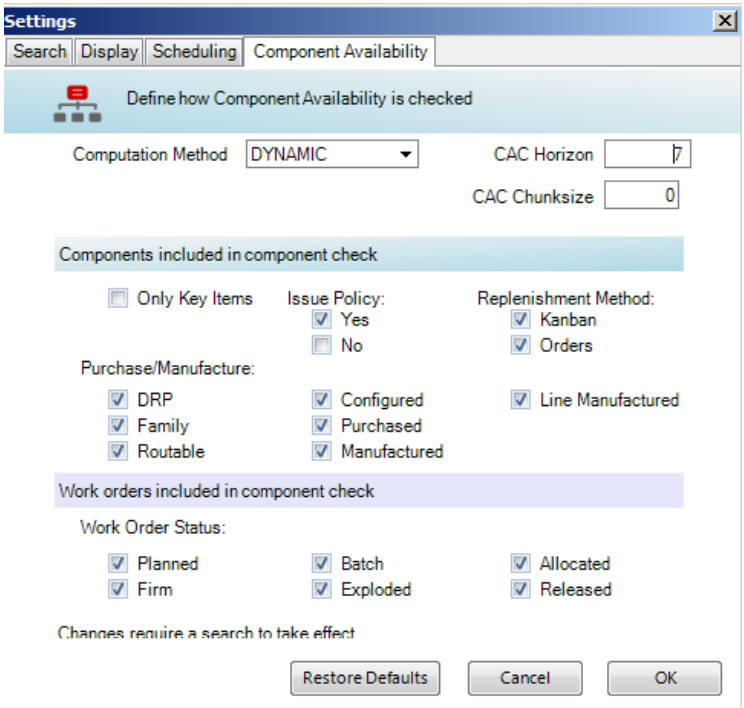
  Covers supporting data that either group of users can access.

CAC User Preferences

You select Option, then Preferences, then the Component Availability tab to set CAC preferences. Set the horizon, then select the components the system includes in the component check:

Important Changes to preferences require that you run Search again.

Fig. 4.1
Settings Window, Component Availability Tab



Computation Method. Indicates how and when CAC processes and calculates data:

None: CAC calculations do not occur during data search retrieval and save. Shortage Report and Production Order Maintenance Component Supply/Demand Summary and Detail windows are blank.

On Search Save: CAC is enabled and calculations occur during data retrieval and save. Component status information displays in the Production Order Maintenance tab, the order component list panel, the Component Supply/Demand Summary and Details Panels, and the Shortage Report

- Dynamic: CAC processes dynamically and on-demand for only the items you select on the workbenches. CAC does not process during search and save functions as background processing on all orders in the horizon.

  Note This feature only works when navigating on the MSW Schedule Grid. Navigation on the PSW does not invoke Dynamic CAC.

  When you select Dynamic and modify a production order for a selected item and save changes, the system clears the CAC statuses for all prior work orders and items selected; then, it recalculates the CAC statuses for the items and orders that you are currently focused on.

  You can see the CAC calculations for the item you are focused on in the Production Order Maintenance tab in the right-side order summary window in the Component Status column.

  Note When you create a new item, the Component Status column has no value for the item until you save the new item.

  The Dynamic option is useful when you may only schedule a few dozen items and work orders; otherwise, when On Search Save is selected, the system can perform CAC calculations for a number of work orders and components, which can increase the data retrieval time. When you select a new row/item before CAC processing completes on a prior row/item, the system cancels the prior row/item CAC.

CAC Horizon. Enter the number of days into the future within which the CAC calculations consider MRP detail data. The system counts the number of days from the due date of the production order, not the release date.

Typically, CAC statuses are relevant only for production orders to be released in the near-term; therefore, you should set this to the horizon within which you expect to be releasing production orders.

If the manufacturing lead time is long, then you should set many days for checking; otherwise, the system does not select orders for checking. For example, this can occur for production orders with a due date that is after the end of the horizon.

CAC Chunksize. Specify a number that represents the number of work order component detail records that are sent in each call to the server.

Single, large CAC calculation server calls that take more than five minutes can result in timeout problems when running over a wide-area network (WAN) or using the OpenEdge AppServer Internet Adapter. You can divide a single large, long-running CAC calculation server call into a number of smaller and shorter server calls to shorten the processing time per call and avoid timeout problems.

When you set CAC Chunksize to a non-zero value, this indicates the maximum number of work order component detail records that the system sends in each call to the Appserver.

When you set CAC Chunksize to 0 (zero), chunking is disabled and the system sends all work order component detail records in one call to the Appserver.

Only Key Items. Indicate whether to include only key items when calculating CAC. Key items are identified using Item Master Maintenance (1.4.1), Item Inventory Data Maintenance (1.4.5) or Item-Site Inventory Data Maintenance(1.4.6).

No: Both key items and non-key items are included in the CAC calculation.

Yes: Only key items are included in the CAC calculation.

Issue Policy. Indicate whether to include items according to their Issue Policy. Issue Policy is set using Item Master Maintenance (1.4.1), Item Planning Data Maintenance (1.4.7) or Item-Site Planning Data Maintenance(1.4.17).

Issue Policy Yes:

Not checked: Items with Issue Policy set to Yes are not included in the CAC calculation.

Checked: Items with Issue Policy set to Yes are included in the CAC calculation.

Issue Policy No:

Not checked: Items with Issue Policy set to No are not included in the CAC calculation.

Checked: Items with Issue Policy set to No are included in the CAC calculation.

Replenishment Method. Indicate whether to include items according to their replenishment method. You set the replenishment method using Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7) or Item-Site Planning Maintenance (1.4.17).

Replenishment Method Kanban:

Not checked: Items whose Replenishment Method is set to Kanban are not included in the CAC calculation.

Checked: Items whose Replenishment Method is set to Kanban are included in the CAC calculation.

Replenishment Method Orders:

Not checked: Items whose Replenishment Method is set to Orders are not included in the CAC calculation.

Checked: Items whose Replenishment Method is set to Orders are included in the CAC calculation

Purchase/Manufacture. Indicate whether to include items according to their Purchase/Manufacture code. Purchase/Manufacture code is set using Item Master Maintenance (1.4.1), Item Planning Maintenance (1.4.7), or Item-Site Planning Maintenance (1.4.17). Items for each possible Purchase/Manufacture code type can be selected or not selected by checking or unchecking its check box:

Not checked: Items with the indicated Purchase/Manufacture code are not included in the CAC calculation.

Checked: Items with the indicated Purchase/Manufacture code are included in the CAC calculation.

Work Order Status. Select a particular order status to be included in the CAC calculation. Selecting an order status reduces the number of work orders for which CAC is calculated, thereby reducing the overall calculation time. You can select from the following statuses:

P(lanned)

F(irm)

B(atch)

E(xploded)

A(llocated)

R(eleased)

The system calculates CAC status for the specified order types only. The system does not calculate orders with a status you did not select and sets the status of unselected orders to a CAC status of `No Status`.

Use CAC to Schedule Production

CAC provides visibility during master scheduling, production scheduling, and the releasing of production orders. For each production order, you can view the component status of the order. During production sequencing, you can determine if there are material constraints in the production schedule, and drill down to determine the problem and possible resolutions.

Prior to releasing production schedules or orders to the shop floor, you can verify which orders have the necessary materials before releasing to the shop floor. You have full details of the materials issued and specific shortages by item.

Use CAC features within PSW to:

- Release production orders to the shop floor that have the necessary components available.
- Calculate and display the severity of a material shortage at the production order and component levels.
- Help you:
  - Release production orders to the shop floor that have the necessary components available.
  - Calculate and display the severity of a material shortage at the production order and component levels.
  - Determine when the next material receipt will be available in the case of material shortages.
- Drill down into the material shortage details for a component to analyze the cause and possible solutions.
- Simulate a schedule change and recalculate production order material status for all production orders sharing common components when a production order is modified.
- Output production orders related to particular release dates to a spreadsheet that can include the component status when you indicated to display the status column in the Sequence Grid.

The following subsections provide procedures to check components during production scheduling, followed by information to configure CAC.

Component Check Example

As a Production Planner, you want to ensure that all production orders scheduled for the upcoming week have enough components available. You run the MSW/PSW to look at production orders that have a release date during the next seven days.

The Shortage Report tab in the MSW/PSW displays all production order component records with a status of Projected Shortage or Shortage. You look at the Supply/Demand Summary data under the Components tab in Production Order Maintenance to see the cumulative supply and demand

information for that production order component detail record. To get more information, you look at data under the Supply/Demand Details tab to view the MRP details the system used to calculate the production order component status.

You have several options to resolve the shortage. You can reschedule either supply or demand. For example, to reschedule supply you can reschedule a purchase order receipt if the component is purchased. Or, if the component is manufactured, you can reschedule a production order. To reschedule demand, you could reschedule a sales order or forecast demand.

Once you make the change, refresh the data to determine if the shortage no longer exists for the component.

Working with CAC Data

The system retrieves production order component detail records when CAC is enabled. The system calculates CAC statuses when it returns data from your initial search for records and displays the production order component status of each production order retrieved. Results are shown in the Component Status column within the Sequence Grid; see Figure 4.2. They also display in the same-named column in the Production Order Maintenance Summary List and in the Components sub-tab in the workbenches; see Figure 2.25 on page 52.

When a production order has a component or components tied to it with a Shortage or Projected Shortage status, then the Component Status field tied to the production order is colored red.

Changing Production Orders

To have the component availability status recalculated when production order data is changed, you must save your changes. If you change the quantity of an order or change the release date, this can affect CAC data.

Component Check Calculations

The system calculates component availability for a production order component record by calculating projected quantity on hand (PQOH) using MRP supply and demand detail information.

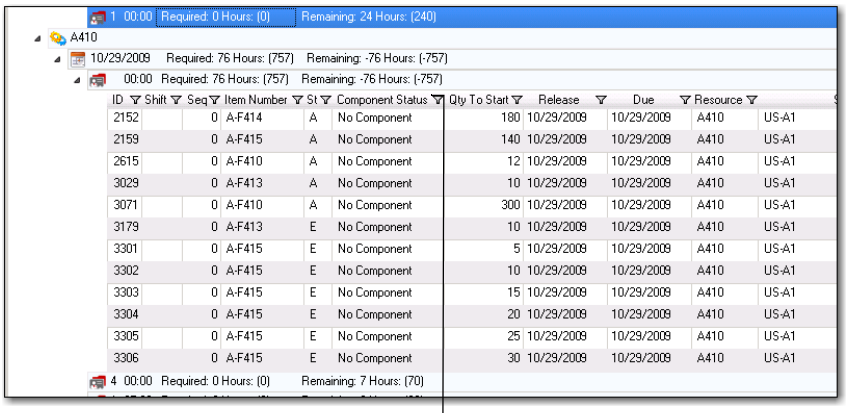
The system factors these key considerations when computing the time-phased consumption and supply of material:

- For component demand records:
  - Release dates: oldest demand records processed first
  - Shift and sequence
  - Orders status: Authorized, Firmed, then Planned
  - R and A orders have priority over F and P orders, regardless of consumption date.
- For component supply records:
  - Due dates
  - Order status: Authorized, Firmed then Planned
  - Expiration dates

Displayed Calculation Results

The calculation results display in the Component Status column within the PSW Sequence Grid. They also display in the summary list of the Production Order Maintenance tab and in its Components sub-tab.

Fig. 4.2
Sequence Grid, Component Status Column



The Component Status column displays a textual description of the status. The following lists the possible component status in order of severity.

No components: The work order does not have any components.

Issued complete: All materials have been issued for the work order component.

Available: Sufficient inventory is projected to be available for the production order component. This includes nettable on-hand inventory and non-expired component supply.

Note Nettable inventory includes inventory that may not be of inventory status available.

Scheduled Receipts: Sufficient inventory is projected to be available for the production order component. This includes nettable or non-expired inventory, plus authorized receipts and firm purchased and manufactured receipts component supply.

Authorized Receipts: Sufficient inventory is projected to be available for the production order component. This includes nettable or non-expired inventory and authorized purchased (unconfirmed ASNs) and manufactured (allocated and released) receipts component supply.

Planned Receipts: Sufficient inventory is projected to be available for the production order component. This includes nettable or non-expired inventory, plus authorized receipts and Firm Receipts, and planned purchased and manufactured planned receipts component supply.

Projected Shortage: There is insufficient inventory is projected to be available for the work order component after considering all sources of component supply.

Shortage: Same as Projected Shortage, but only applies to work orders with status A(llocated) and R(eleased).

No Status: CAC not computed for the component. This can occur because:

- Component excluded from CAC check per user preference settings.
- Components where item master issue policy is set to No.

- Type of BOM component; some component types are not factored by MRP, so CAC does not process them either.
- CAC horizon does not include the production order and associated components during processing.
- MRP detail records have been deleted since data was loaded into the workbenches; to check, you can run MRP and a perform a new search on the workbenches.

Note The status also applies to the Release Production Orders by Production Line, Manage Materials for Production Line, Release Production Orders by Work Center, and Manage Materials for Work Center component availability browse collections within QAD EE.

Production Order Status

When calculating component availability, the system considers the status of a production order. Production orders can have a status of:

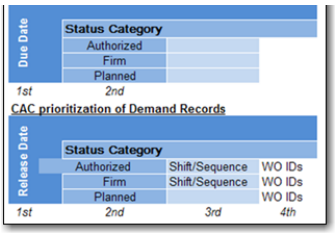
- (A)llocated
- (B)atch
- (E)xploded
- (F)irm
- (P)lanned
- (R)eleased

The system groups the production order statuses into three status categories when calculating component availability:

- Planned: Planned production orders are in this category.
- Firm: Firm, Batch, and Exploded production orders are in the Firm category.
- Authorized: Allocated and Released production orders are in this category.

The following depicts where the system applies demand/supply records to the appropriate status category.

Fig. 4.3
Supply/Demand and Status Categories



Supply/Demand	Order Type	Applied To Status Categories		
		Authorized	*Firm*	*Planned*
Both	Production Order (released)	x	x	x
Both	Production Order (allocated)	x	x	x
Supply	ASN Receipt	x	x	x
Supply	DRP (intransit)	x	x	x
Supply	Expiring Inventory	x	x	x
Both	Production Order (firm)		x	x
Demand	Sales Order		x	x
Supply	Purchase Order		x	x
Supply	Supplier Schedule (firm)		x	x
Demand (site)	DRP Intersite Request (follows same logic as supply work orders)	.....	....	.....
Supply (site)	DRP Intersite Demand (shipped)	x		
Supply (site)	DRP Intersite Demand (scheduled) "follows same logic as work orders"	.....	...	....
Supply	Supplier Schedule (plan)			x
Demand	Forecasts			x
Both	Production Order (planned)			x
Supply	DRP (planned)			x

The steps the system follows for sequenced production orders to calculate their POH and CAC status are as follows:

1. Determine the status category for a production order.
2. Within a production order status category, process by due date, then shift.
3. If no shift start time is defined, then shift processing is sequential (1.2.3.4...and so on). Shift 0 is processed last for each status category.
4. Within a production order status category, process by sequence. Sequence 0 is processed last.
5. If no sequence number is defined, process by production order ID.

Shortage Report

As part of the CAC features integrated into the workbenches, you can access the Short Report tab within the workbenches. Production planners, material ex ped i tors, or schedulers can generate a list of components with shortages that impact the scheduler's production schedules for the production lines or work centers. In the report, these users can expand an item to see details regarding the shortage, such as the first date the shortage occurs, which production line or work center is impacted, and the most recent supplier/PO found in the system for the component.

You click on the Shortage Report tab at the top of the workbench to display a report that provides the following data:

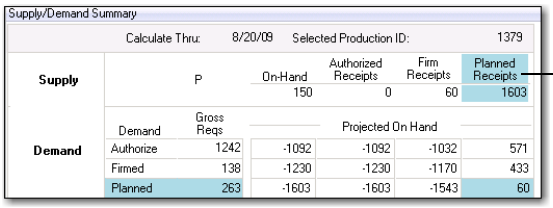
- Component item number, description, and CAC status
- Quantity short and gross requirements
- Next scheduled receipt and receipt ID
- Buyer/planner

- Pur/Mfg code and parent item
- Production order ID, status, and operation
- Production line, work center, and site

Use CAC to Check Component Requirements

Use the following topics to help you check components for production order requirements. You can check the Component Status column in the PSW Sequence Grid. Planned Receipts can display in the Component Status column. When it does, there is sufficient inventory projected to be available for the production order component. The data in the Component Status column includes nettable on-hand inventory, unconfirmed shipper receipts, scheduled receipts, and planned receipts.

Fig. 4.4
Planned Receipts



View planned receipts in Production Order Maintenance, Components Tab.

You can rectify shortages by determining if the depending assembly production order for the component can be completed earlier, or if a purchase order receipt can be moved up. Additionally, you could see if the quantity of an outstanding discrete purchase order or supplier schedule can be increased.

Exporting Data

You can export the data that displays in the Shortage Report and the PSW to a Microsoft Office Excel spreadsheet.

From within the Shortage Report, right-click on any field within the report, then select Export Report. When you export, the system retains the structure/formatting of the source data.

Supporting Data

When you see that you have a potential shortage or a shortage for a production order, you can drill down into the details behind the component status using the supporting data at the bottom of the PSW. Specifically, you can drill down to Production Order Maintenance, then select the Components tab to see the following data:

- List of components related to the production order in focus within the Sequence Grid
- Supply/demand summary
- Supply/demand details
- Inventory details

You can also run a Shortage Report by selecting that tab within the workbenches.

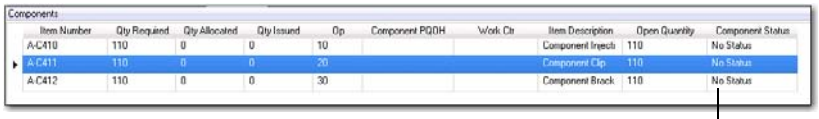
The following topics discuss data found under the Production Order Maintenance Components tab.

Component List

When you select the Component sub-tab within the Production Order Maintenance tab in the workbenches, component information is divided into two parts: the left side displays the BOM list of a production order, including component status, picking and issuing status, while the right side provides more data through tab selections.

Important The system shows one level down in the BOM only, except when there is a phantom at that level.

Fig. 4.5
Component Summary List



View the component status here. A? indicates the system has not calculated the status yet.

Item Number/Description. The number and description of the component that is behind the component status of the selected production order in the Sequence Grid.

Component Status. The status related to the POH of the component.

Quantity Required. The original quantity required for the item/production order.

Quantity Allocated. The quantity allocated for the item/production order.

Quantity Issued. The quantity already issued for the item/production order.

Op. The ID of the operation from where the component is backflushed.

Work Center. The ID of the work center to which the component is issued.

Component POH. The system-calculated value for projected quantity on hand for the component, considering all prior demand/supply, including the demand of the selected order. This does not include future production orders of Authorized status; however, Allocated/Released would also be included in the POH calculation.

Open Quantity. The open quantity for the production order.

Note You can add/remove fields to this panel in the .NET UI Browse Maintenance program.

Supply/Demand Summary

The Supply/Demand Summary Panel provides a summary of all supply/demand records for the selected component. It summarizes the total demand and supply for the component, considering the production order demand from the production order selected in the Sequence Grid.

Use the data in this panel to determine how the component projected on-hand was calculated using the following data:

- Prior scheduled production orders that also require the component
- Prior incoming supply for the component
- Authorized, firmed, or only planned replenishment

Rows, cells, and columns are automatically highlighted in the panel as follows:

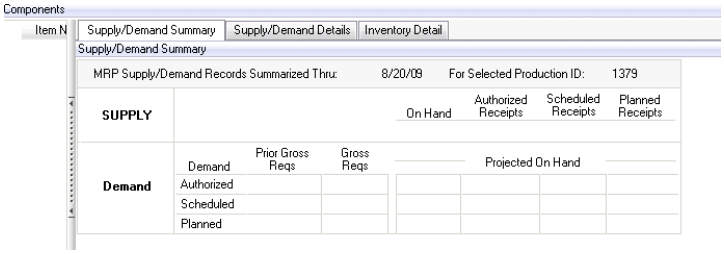
- Demand rows: Highlighted demand row cells indicate that the demand row status category (planned, scheduled, authorized) is equal to the selected production order status.
- Projected On Hand: Highlighted Projected On Hand cell indicates the source POH for the selected component.
- Supply cell column: The highlighted supply cell column indicates the Projected On Hand value that was used to determine the component status.

The Supply/Demand Summary Panel lets you view the aggregated records from a matrix point of view:

- The top portion displays supply quantities. It lists the current quantity On Hand for the production order component item and other sources of supply up to the due date of the production order component record.
- The lower portion displays demand quantities. It lists the three categories of demand (Authorized, Scheduled, and Planned). Each row starts with prior demand requirements and the gross requirements of the selected production order component record. Then, from left to right, it adds in the current QOH, then adds in the other cumulative supply quantities to calculate the projected on-hand quantities.

This supply and demand matrix format provides you with a global view of component supply/demand.

Fig. 4.6
Supply/Demand Summary Panel



MRP Supply/Demand Records Summarized Thru. The issue date of the selected production order component record.

For Selected Production Order ID. The production order ID of the selected production order component record.

On Hand. The nettable, on-hand inventory found in all locations across the site.

Authorized Receipts. The sum of all authorized receipts prior to the Issue Date of the selected production order component record. Authorized receipts are sources of supply and include:

- Production orders with a status of Allocated or Released that cover production order component requirements
- Unconfirmed ASNs that cover the production order component requirements

Firm Receipts. The sum of all firm receipts before the Issue Date of the selected production order component record.

Planned Receipts. The sum of all planned receipts before the Issue Date of the selected production order component record.

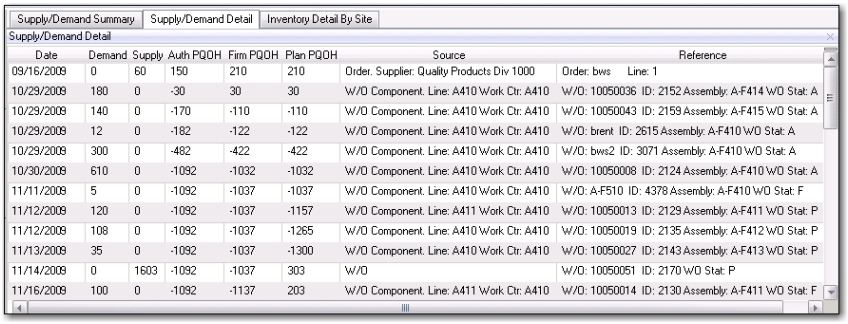
Gross Reqs. The current open quantity of the selected production order component record not netted with inventory.

Supply/Demand Details

Use the data in the panel to easily:

- View demand detail information; for example, demand source, due date, and quantity.
- View supply detail information; for example, supply source, due date, and quantity.
- Determine when inventory expires and the impact on production.
- Identify where you should reprioritize; for example, you can correct a shortage if you expedite production order B and reschedule production order A.

Fig. 4.7
Supply/Demand Details


Supply/Demand Summary | Supply/Demand Detail | Inventory Detail By Site

Supply/Demand Detail

Date	Demand	Supply	Auth PQOH	Firm PQOH	Plan PQOH	Source	Reference
09/16/2009	0	60	150	210	210	Order. Supplier: Quality Products Div 1000	Order: bws Line: 1
10/29/2009	180	0	-30	30	30	W/O Component. Line: A410 Work Ctr: A410	W/O: 10050036 ID: 2152 Assembly: A-F414 WO Stat: A
10/29/2009	140	0	-170	-110	-110	W/O Component. Line: A410 Work Ctr: A410	W/O: 10050043 ID: 2159 Assembly: A-F415 WO Stat: A
10/29/2009	12	0	-182	-122	-122	W/O Component. Line: A410 Work Ctr: A410	W/O: brent ID: 2615 Assembly: A-F410 WO Stat: A
10/29/2009	300	0	-482	-422	-422	W/O Component. Line: A410 Work Ctr: A410	W/O: bws2 ID: 3071 Assembly: A-F410 WO Stat: A
10/30/2009	610	0	-1092	-1032	-1032	W/O Component. Line: A410 Work Ctr: A410	W/O: 10050008 ID: 2124 Assembly: A-F410 WO Stat: A
11/11/2009	5	0	-1092	-1037	-1037	W/O Component. Line: A410 Work Ctr: A410	W/O: A-F510 ID: 4378 Assembly: A-F410 WO Stat: F
11/12/2009	120	0	-1092	-1037	-1157	W/O Component. Line: A411 Work Ctr: A410	W/O: 10050013 ID: 2129 Assembly: A-F411 WO Stat: P
11/12/2009	108	0	-1092	-1037	-1265	W/O Component. Line: A410 Work Ctr: A410	W/O: 10050019 ID: 2135 Assembly: A-F412 WO Stat: P
11/13/2009	35	0	-1092	-1037	-1300	W/O Component. Line: A410 Work Ctr: A410	W/O: 10050027 ID: 2143 Assembly: A-F413 WO Stat: P
11/14/2009	0	1603	-1092	-1037	303	W/O	W/O: 10050051 ID: 2170 WO Stat: P
11/16/2009	100	0	-1092	-1137	203	W/O Component. Line: A411 Work Ctr: A410	W/O: 10050014 ID: 2130 Assembly: A-F411 WO Stat: F

Date. The release dates for demand records or the due dates for supply records.

Demand. The standard MRP definition for demand.

Supply. The standard MRP definition for supply.

Auth POH. The POH of all authorized demand/supply records.

Firm POH. The POH of all firm and authorized demand/supply records.

Plan POH. The POH of all planned, firm and authorized demand/supply records

Source. The demand/supply record source; for example, production order, sales order, production line, and so on.

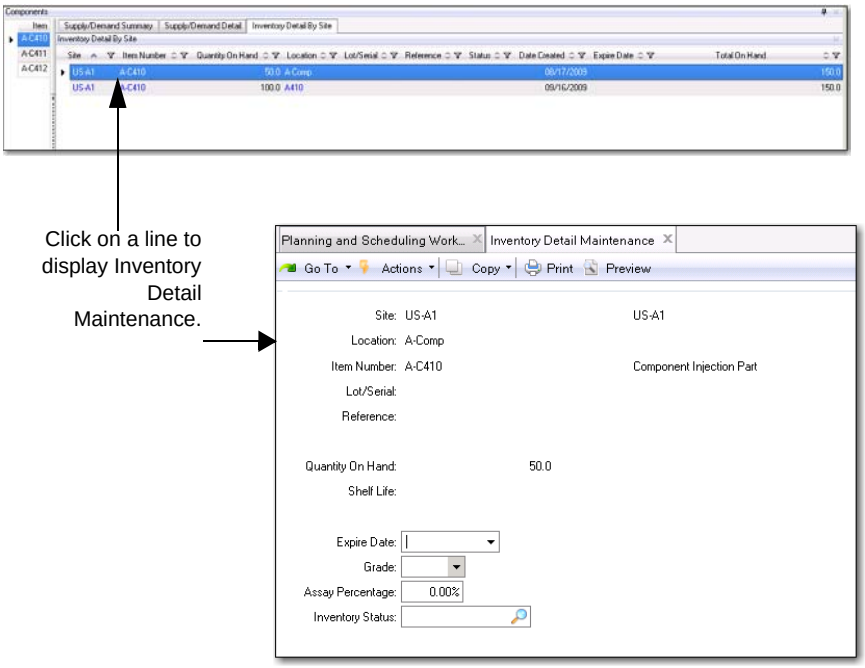
Reference. he demand/supply record reference; for example, the order number, assembly item number, and so on.

Inventory Details by Site

Use the data in the Inventory Details sub-tab to drill into component inventory detail records to determine options when dealing with component shortages.

When you select a record within the Inventory Details by Site Panel, and click on the record, the system launches the QAD EE Inventory Detail Maintenance program.

Fig. 4.8
Inventory Details by Site



Site. The site associated with the inventory.

Item Number. The item number.

Quantity on Hand. The system organizes inventory detail data by item, site, location, lot/serial, then reference. For each unique combination of these values, the system tracks the quantity on hand and other inventory attributes, such as expire date and status.

Location. The ID of the physical location where inventory is stored.

Lot/Serial. The lot/serial number for the item.

Reference. The lot reference number.

Status. The inventory status code associated with the inventory quantity. Inventory status codes determine whether inventory balances are available for allocation, are considered by MRP, or are allowed to go negative. Status codes also restrict particular transactions at specific locations.

Date Created. The date the inventory detail record was created.

Expire Date. The date the inventory expires.

Total on Hand. The total on hand quantity of this item in inventory.

Chapter 5

Co-/By-Products

The following topics describe how to use the features of the MSW and PSW.

Introduction 106
Introduces co- and by-product functionality within the workbenches as well as concepts.

Workbenches Co-/By-Product Features 108
Discusses workbenches features for scheduling orders for co- and by-products.

Setup 111
Describes setup steps you should perform before beginning workbenches scheduling of co- and by-products.

Working with Co-/By-Products in the Workbenches 112
Provides procedures to work with orders for co- and by-products within the workbenches.

Introduction

Within QAD EA, you can use a special set of features for managing processes that create more than one product. Such products are referred to as *joint products*, and each joint product is made up of *co-/by-products*. Processes that create only one product are supported by regular bills of material (BOM) and formulas.

Co-product/by-product features support a variety of manufacturing operations, including batch processing, sorting, molding, support for MRP, work orders, shop floor control, and costing, as well as tools for setting up items, structures, and routings.

You can schedule orders for co- or by-products within the workbenches. You should understand concepts before you begin working with these product types.

Concepts

The following topics discuss concepts you should understand before you schedule co-/by-products within the workbenches.

Co-/By-Products and Base Processes

When scheduling co-/by-products in the workbenches, it is important to know that the workbenches work with base processes. A *base process* is a manufacturing operation that creates more than one product, that is, the co-products or by-products.

Co-products and by-products of a base process do not have their own product structures or routings. These are defined in the base process. Base processes are items containing formulas for co/by-product operations, and are defined in the same way as regular items. A base process has an item record, a product structure with co-/by-products, a formula, routing, and BOM code.

There are some important distinctions between base process items and regular items:

- Base process items are never regarded as items to be stocked. Item status codes are used to restrict inventory transactions related to base process items and to ensure that these items never appear on sales or purchase orders. Should base process items end up in inventory, or on sales or purchase orders, they are ignored by MRP.
- Base process items cannot be used as components in another process.
- Demand for co-products drives the planning of base processes, and the co-product that has the most demand is the one planned for.

MRP and Co-/By-Products

MRP plans orders for a by-product as a result of creating planned orders for a base process. By-product demand is not considered when planning a base process, but MRP creates a joint order set for demand records from the unsatisfied demand for a co-product. An item is a co-product when:

- It is manufactured, that is, the Pur/Mfg code is set to Manufactured, Routable, or blank.
- The BOM or formula code is a base process that has the item as a co-product.

MRP plans for a base process by determining the unsatisfied co-product demand for all co-products that reference the base process as their BOM or formula code. MRP creates planned orders to fill the unsatisfied co-product demand without regard to projected quantities on hand for the base process. MRP does not consider base process inventory.

MRP uses the order policy and order modifiers for the base process, except safety stock, when creating planned orders. When the order policy is not period order quantity (POQ) or fixed order quantity (FOQ), MRP uses an order policy of POQ. If no order period is specified, MRP uses an order period of seven days.

When MRP plans a base process, it searches for the first unsatisfied demand record for a co-product. Then, depending on whether the order policy is POQ or FOQ, MRP evaluates unsatisfied demand records for all co-products of the base process:

POQ: MRP searches from the first unsatisfied demand record through the end of the order period.

FOQ: MRP looks at all unsatisfied demand records for all co-products that fall on the same date as the first unsatisfied demand record.

MRP creates one or more planned joint order sets to satisfy demand for the co-product that presents the greatest demand for the base process for a specific date or date range. As a result, planned orders for the other co-products of the base process are also created. MRP also creates action messages for base processes and co-products, but not for by-products.

Joint Order Sets

The workbenches provides the ability to manage and monitor *joint order sets*—two or more production orders that are dependent upon each other. Managing orders for co-/by-product functionality is an example of production order set management.

A joint order set must have only one base process order and at least one co-product order. If you delete the base process order or the only co-product order, the entire set is deleted.

A joint order set consists of the following production orders or order attributes:

- Order for the base process
- Order for each co-product and by-product
- Bill for the bases process
- Routing for the base process
- Same production order number

Joint orders can be added to or deleted from a joint set when the status is Exploded, Allocated, or Released. Since a joint order set must have only one base process order, when you delete the base process order or the only co-product order, the entire set is deleted.

For workbenches considerations:

- Only the base process order is sequenced and has a sequence value, so, only the base-process is shown in the PSW for sequencing.
- All orders within a joint set must have the same production line.

Workbenches Co-/By-Product Features

QAD EE lets you manage a process that creates more than one product, such as co-/by-products. Within QAD EE , you have the ability to manage co/by-product orders as discrete orders. The workbenches use the same co-/by-product features found in QAD EE. Within the workbenches, you can:

- Display base process items, co-/by-product items, and co-/by-product orders on production lines

  Note The PSW only displays and sequences base process orders.
- Display co-/by-product items on work centers (MSW only)
- Display calculated CAC status for base process orders
- Update due dates and depending on order status, optionally synchronize the updated dates across all orders in the set
- Update quantities and depending on order status, optionally synchronize the updated quantity across all orders in the set
- Set an option to automatically synchronize changes in order status and production line across the joint order set

Co-/By-Product Orders

You can retrieve co-/by-product joint order sets in the workbenches.

The workbenches let you schedule discrete joint product order sets. These sets include:

- One base order
- One or more co--product orders
- One or more by-product orders

The workbenches display base items in the Scheduling Grids. In the Schedule Grid, you can generate a joint product order set by either creating an order for the base process or for a co-product.

The base item production order contains all master data for the joint order set, such as BOM data, routings, and so on. The base scheduled order is for scheduling the co-/by-product orders to track quantity completed and requirements for the schedules.

It is important that you know that for co-/by-product orders (joint order set), when you schedule co-by product orders, the system creates a joint work order set. The orders have the same WO number, and the relationship among them is defined technically. When you modify any order in the set, the system immediately synchronizes changes across all orders in the set.

Discrete Orders

The QAD EE legacy co-\by-product capabilities are only available for discrete work orders. The workbenches let you schedule both discrete and repetitive orders on a production line. This means that when you schedule with the workbenches, you leverage the co-/by- product functionality in a repetitive environment because the workbenches let you schedule discrete joint order sets on a production line.

If you use the workbenches for repetitive scheduling, but require co-/by-product scheduling functions, you should consider whether scheduling with discrete orders meets your requirements. When you consider this change, you should keep in mind these additional changes:

- To backflush, you must use Work Order Receipt Backflush (16.12) and Work Order Operation Backflush (16.19) for backflushing instead of advanced repetitive Backflush Transaction (18.22.13).
- There are costing differences between discrete and repetitive orders.

CAC

The system calculates CAC status only for the base process order in the joint order set. The CAC status for all co- and by-product orders is always `No Status`.

This is because the base process order in the joint set contains all components and routings of the joint product. Co-/by-product orders do not have components or routings; therefore, they have no CAC status to calculate. Also, the base process order is always shown in the MSW and PSW, while co-/by-product orders are only visible in the MSW. So, the system calculates the base process order component availability.

Production Order Maintenance Order Relationship Tab

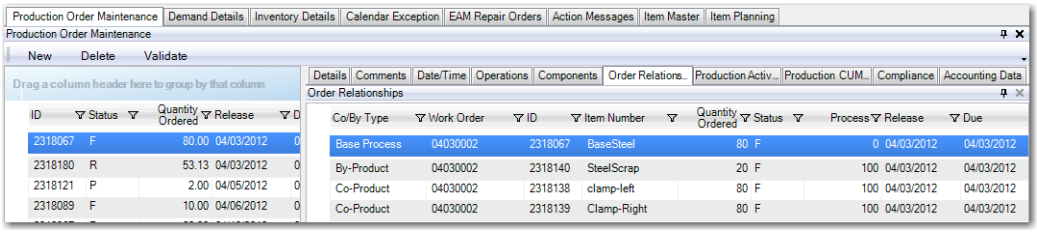
You can use the Order Relationship Tab within the Production Order Maintenance frame at the bottom of the workbenches to view order relationships as defined in production order sets.

In the MSW or PSW grids, when you select a production line or work center and an item, the system displays all production order records for the selected item.

When you select the Order Relationship tab, you can view related production orders. When you select an item in the schedule grid that has related work orders where there is only a match on work order numbers, the Order Relationship tab displays all related orders where a production order number matches the product order number of the production order record you select.

Figure 5.1 depicts order data in the Order Relationship tab. The frame shows joint product order sets. All other types of orders that have the same order number (that is, split orders) do not display in the frame.

Fig. 5.1
Order Relationship Tab



Co/By Type. Co-/by-product orders define a joint order set. When a co-/by-product order is scheduled, the system creates a joint work order set. The relationship among these orders is defined technically by the order type and by having the same WO number.

When you modify any order in the order set, the system automatically synchronizes the changes across all orders in the order sets.

ID. The work order identification number.

When an order relationship is created via the work order ID, you may need to maintain the relationships between the orders, such as order quantities or due and release dates.

Item Number. The item for a base process, a co-product, or by-product.

Quantity Ordered. This field displays the quantity per base process.

Note In Process/Formula Maintenance (15.18) or Co/By-Product Maintenance (15.12.1), you define how many co- or by-products to create from one base process.

Status. The production order status, that is, Planned, Firm, Exploded, Allocated, Released, or Closed.

Process. The percentage as depicted by forecast percentage, specified in Formula Maintenance. When the Process percentage does not display, the value is 0% (zero).

Release. The order release date.

Due. The order due date.

BOM/Formula Code. This field is display only for base process orders. You can modify it for co- and by-product orders.

Adjust Co/By Order Quantities. Enter Yes or No to adjust the quantities for the order.

Yes: The system automatically rescales all order quantities in the joint order set. The work order status must be E, A, R, or C to optionally rescale quantities. Joint order quantities are recalculated automatically when:

- Order quantity changes on a joint order with an Firm status,
- Status of a work order changes from any status to Firm.
- Status of a work order changes from Batch, Planned, or Firm, to Firm, Exploded, Allocated, or Released.

The system calculates the quantities for joint orders from quantities entered in Co/By-Product Maintenance (15.12.1). Order quantities for a joint order set can be recalculated automatically or maintained manually, depending on the work order status.

No: The system changes only the order being modified; other orders in the set are not modified. When this happens, the system automatically changes the order status to E.

Adjust Co/By Order Dates. Enter Yes or No to adjust co- or by-product order dates.

Yes: The system resynchronizes the dates for all orders in the joint order set. The work order status must be E, A, R, or C to optionally adjust dates. Firm status orders always resynchronize the dates for all orders in the set. Default due dates for orders in a joint set are calculated using the manufacturing lead time for the base process. Existing current EE logic that allows for modifications to the order joint set must be preserved.

No: When No, the system only modifies the order you change. Other orders in the set are not modified. When this happens, the system automatically changes the order status to Exploded.

The order set is deleted only when you delete the base process order or the last co-product order.

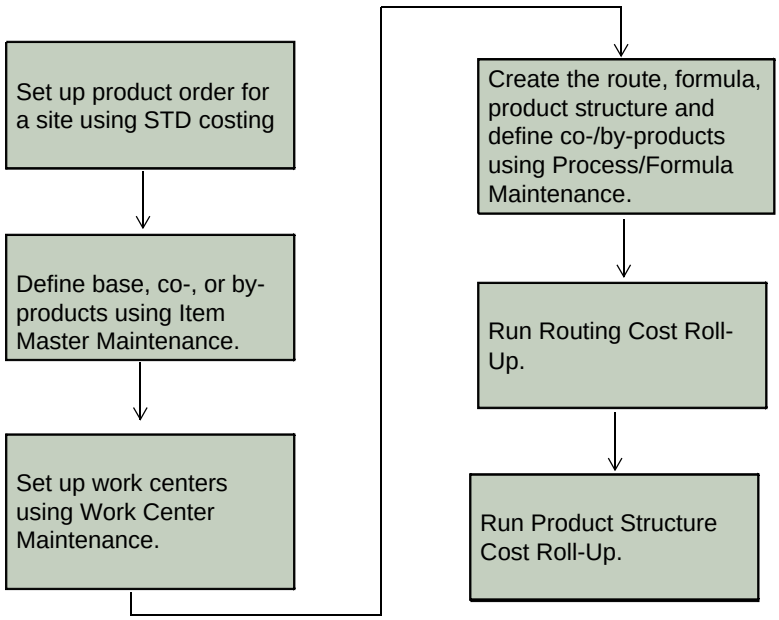
Setup

You set up co-/by-products within QAD EA programs as you normally do. Implementing and managing co-products/by-products involves:

- Setting up an operation for co-products and by-products
- Developing standard and simulation costs
- Implementing material requirements planning (MRP)
- Managing the work order life cycle for the related products

See Figure 5.2. Refer to *User Guide: QAD Manufacturing* for information on co-/by-product functionality within QAD EA applications, including setting up operations for co-/by-products.

Fig. 5.2
Co-/By-Product QAD EA Setup



Workbenches Setup

For scheduling within the workbenches, you only set up the base process item on production lines, so, there is no need for specific co-/by-product item setup. Since the co-/by-products are defined for a base process, when you add the base process to a production line, the system automatically adds the co-/by-products to that production line.

You only set up the base process on the production line because the system adds the co-and by-products automatically. You can also setup a co-product on a production line and the system adds its primary base process (BOM/formula on the item) and related co-and by-products to the production line.

When scheduling a co-/by-product order sets, all order parameters, such as routing, BOM, run rate, setup time, default from the base process item. When you set up production lines, the system only considers the production line item field values for the base process item. The system does not consider production line item records for co-/by-product items for scheduling purposes.

For work centers/operation, the run rate, setup time, and so on are based on the routing of the base process item, too.

Working with Co-/By-Products in the Workbenches

You can use the MSW or PSW to schedule orders for joint order sets. You can manage both production line and work center orders for co-/by-products in the MSW or manage production lines only in the PSW for co-/by-product orders.

The topics below tell you how to create demand in QAD EA programs so that data displays in the workbenches. Following that, the topics discuss workbenches co-/by-product functionality, including:

- Display Co-By Product Items
- Retrieve Co-/By-Product Records
- Manage Base Process Items
- Update Dates and Quantities for Order Sets
- Create an Order for Co-/By-Product Items
- Delete Orders
- Split Production Orders

Create Demand in QAD EA

The joint set is created when there is demand for a co-product. To create the demand, use QAD EA programs to:

1. Create structure code in fmmamt.p (15.1)
2. Create formula structure in fmopmt.p (15.18)
3. Roll up costs for routing
4. Roll up costs for product structure
5. Create a demand for the product/item at the site.
6. Run MPR to create a planned joint set.
7. View the planned joint set in QAD EA maintenance programs.

Note The capacity planning is done at the base order level.

Display Co-By Product Items

For production lines, use either the MSW or PSW to display:

- Base process items
- Co-/by-product items
- Co-/by-product production orders
- Co-/by-product joint order sets

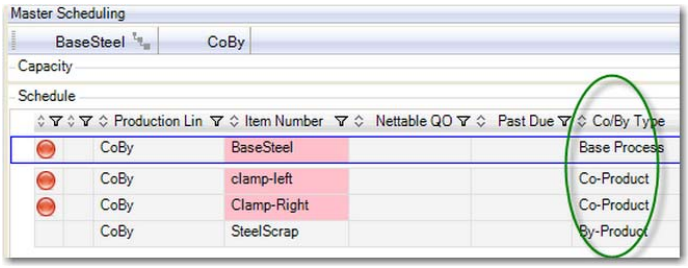
For work centers, use only the MSW to display:

- Base process items
- Co-/by-product items
- Co-/by-product orders
- Co-/by-product joint order sets

The MSW Schedule Grid displays all base and co-/by-product items and production order quantities by production order due date of the base process production order. Work center data includes the display of quantities by operation due date of the base process production order. Production lines display order header record data; work centers display production order operation record data.

Note To suppress base process items or by-product items from the Schedule Grid, you must add a column to you view to filter out base and by-product item types. You add the Co/By Type column by right-clicking and selecting to add a column. The following graphic depicts the column in the MSW Schedule Grid.

Fig. 5.3



Note The PSW Schedule Grid *only* displays the production order records of the base process item.

Disabled Fields

In the Production Order Maintenance frame within the workbenches, fields that do not allow you to input values are disabled and grayed.

Fields in the Details Frame in the Production Order Maintenance portion of the MSW are disabled for all co and by product orders.

Retrieve Co-/By-Product Records

You can retrieve co-/by-product joint order sets in the workbenches. For any work order belonging to a joint order set, the search process retrieves all work orders, related to the joint order set.

Manage Base Process Items

The base item displays in the workbenches. The base item production order contains all master data for the joint order set, including BOM, routings, and so on. You can create a joint order set in the Schedule Grid by entering a quantity for a base process item or a co-product item.

The workbenches do not prompt you to schedule the base item on the MSW, since there is never direct demand (forecasts/sales orders) for the base process item.

Calculations

For work center machines, the required capacity is driven from the base process operation required capacity related to:

- MSW operation due date
- PSW operation release date

For production lines, the required capacity is driven from the base process order header required capacity related to:

- MSW order due date
- PSW order release date

Note Co-/by-product orders are not considered from a required capacity perspective.

For each base and co-/by-product item, the POH is based on the work order quantity of each individual base and co-/by-product order per the work order due date. When applying a negative POH color indicator to co-/by-product orders, the system never applies the color to base process items since the POH of the base item is never negative.

Update Dates and Quantities for Order Sets

For production lines, you can schedule the co/by-product items, modifying the order header level data only.

You can schedule co/by-product *discrete orders* on production lines. This is because repetitive backflushing does not support backflushing of co/by-product items.

For work centers, you can schedule co/by-product order sets or co/by-product items, modifying order header level data only.

The workbenches do not support operational-based scheduling, so, you cannot modify operational due or release dates for co-/by-products.

You can make the following changes to the order sets:

- Update the quantity in MSW Schedule Grid
- Update the quantity and date in the PSW Sequence Grid
- Update the quantity and date in Production Order Detail Maintenance
- Update the quantity and date in the Order Relationships tab in Production Order Maintenance
- Optionally synchronize quantity changes in the Order Relationships tab

Updating Quantities

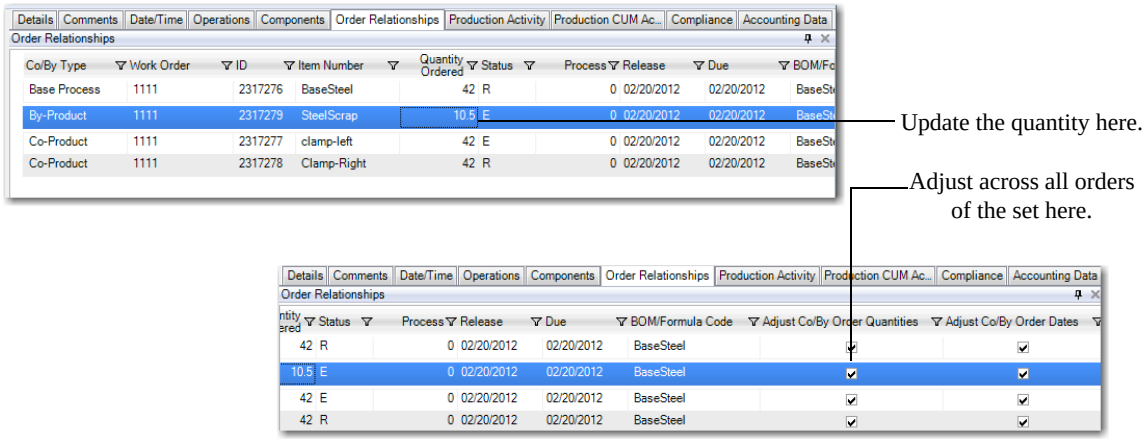
From the workbenches, you can control how many co-/by-products you expect to generate from the base process. You can make changes in the Schedule Grid or Sequence Grid or in Production Order Maintenance tabs within the workbenches.

When the order has an E(xploded) status, you can optionally synchronize the changes across all orders in the order set or just apply the change to the single production order record. You select the Adjust Co/By Order Quantities field to apply changes to all orders.

Example The default expected co-/by-product quantity is 10, but you adjust the value to 12. The system prompts you to synchronize all orders since the order status is E You specify Yes, and the system synchronizes.

The following figure depicts a co-product order within the Order Relationships tab.

Fig. 5.4
Change Quantity



Updating Dates

You can update the production order dates of a co-by-product work order of a joint set in the workbenches. You can make date changes in the Sequence Grid or in Production Order Maintenance tabs within the workbenches. For example, using the Adjust Co/By Order Dates field in the Operational Relationship tab of the Production Order Maintenance within the workbenches, you can control expected release/due dates of each order within the order set. The system always synchronizes across the orders when you modify the date. When you deselect the Adjust Co/By Order Dates field, the system does not synchronize changes you make to the order.

Example The default expected co-product release or due date is 4/01; however, you select Yes to adjust the date and change the date to 4/02. The system synchronizes all order dates to 4/2 in the order set.

Create an Order for Co-/By-Product Items

The system treats co-/by-product records as standard work order records; however, there are differences. Co-/by-products do not have their own BOM and routing. The system creates a joint order set automatically when the co-product item references the base process BOM on the item master. This is part of the standard set up for joint order items. So, you can create a co-/by-product joint order set dynamically by creating an order from the base process or co-/by-product item.

When you create, the system immediately displays the complete co-/by-product joint order set.The default order due date of all orders in the co-/by-product joint order set are based on workbench current logic. The co-/by-product items must specify the BOM code of the base process item in Item Data Maintenance.

You can add an order to the joint set when you create the order on the workbench and use the same work order number of the joint set on the new order. The item on the new order must be an item not currently part of the joint product structure.

Delete Orders

The joint order set is only deleted when you delete the:

- Base process
- Last co-product order

To delete a co-/by-product order with a status of E(xploded), you must run Work Order Accounting Close (16.21) before you can delete the joint set. This is the standard QAD EE functionality for co-/by-products. Or, you can set the status back to F(irm) to delete the orders.

Split Production Orders

Currently, in the workbenches, you cannot split an order in the joint product order set, even the base process order.

Chapter 6

Enterprise Asset Management

The following topics describe how to view and leverage EAM maintenance and repair work orders within the Master Scheduling Workbench (MSW).

Introduction 118
Introduces EAM in the workbenches.

EAM-Workbenches Setup 118
Describes setup steps you should perform in both EAM and QAD ERP to ensure workbench-EAM integration.

Workbenches EAM Features 123
Introduces EAM workbench features.

Working with EAM Repair Orders 125
Describes the pulled-in QAD EAM work order functions presented in the workbenches, including field descriptions for the various programs.

Introduction

The Planning and Scheduling Workbenches are integrated with QAD Enterprise Asset Management (EAM).

EAM provides supply chain management solutions for project accounting, plant maintenance, repair, and operation, including inventory and purchasing. EAM is integrated with the Manufacturing and Financial modules in QAD ERP, too. Using EAM, you can create entries that describe individual pieces of equipment with assigned attributes, then create repair work orders that reference the equipment entries. These work orders also contain information about how long the equipment is down. It is this aspect of EAM that constitutes the bulk of the interaction with the Planning and Scheduling Workbenches.

Within the Planning and Scheduling Workbenches, you can see information about planned/preventative maintenance work that is scheduled in EAM. Since EAM manages your organization's physical assets by maximizing manufacturing equipment use and minimizing repair costs, you can see EAM orders within the EAM Repair Orders tab that displays at the bottom of the workbenches. You also can see that an order is an EAM order as well as the status of the order by an icon that displays in the Schedule Grid.

The following topics describe in more detail how to display and access EAM repair order data.

EAM Work Orders

EAM work orders outline upcoming maintenance. After the work is complete, the system or users update the work order with summary information. By the time it closes, a work order contains valuable data for historical reporting and analysis.

Work orders can contain information on the equipment ID, a statement of work to be done, any precautions, the employees responsible for doing the labor, the scheduling information, the expense accounting structure, and the recipient of the expense.

When the work is complete, technicians can record the type of failure that caused the event and the type of repair made. They can associate it with specific systems or assemblies on the piece of equipment for clearer definitions of where the problem occurred. They can record the amount of downtime that was associated with the event and the amount of labor that was required to repair the problems.

EAM-Workbenches Setup

Before you can use the Planning and Scheduling Workbenches with EAM work orders, you must set up EAM and QAD ERP integration. The following topics provide more information.

Equipment Mapping

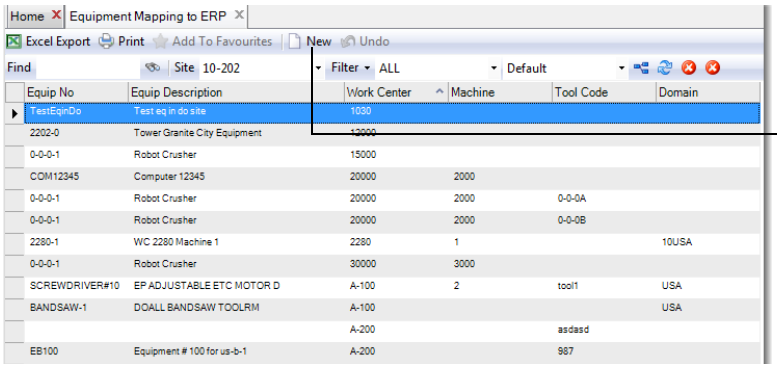
To set up EAM for workbenches integration, you must set up the mapping between the equipment entries of interest to the QAD ERP production lines and work centers of interest. This is done using these EAM programs:

- System Administration/Equipment Mapping to ERP
- System Administration/Production Line Mapping to ERP

Equipment Mapping to ERP

Under System Administration, select Equipment Mapping to ERP to create a *new* equipment record for your work center.

Fig. 6.1
Equipment Mapping to ERP

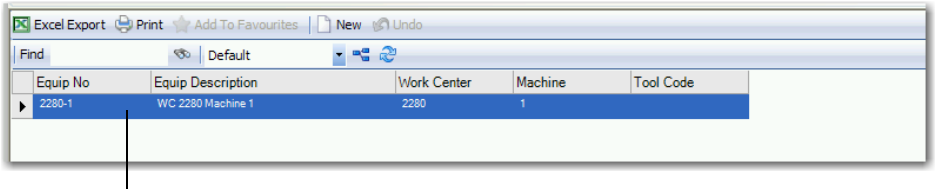


Click the New button to create a new equipment mapping to work center machines as the equipment.

1. Click New to enter a new equipment mapping.
2. Specify the work center as the equipment.
3. Enter other fields as required; then, save your data.

You should see your work center as equipment in any of the EAM equipment lists, as shown in the following figure.

Fig. 6.2
Equipment Mapping to ERP, Work Center



Workbenches work center mapped as equipment to EAM.

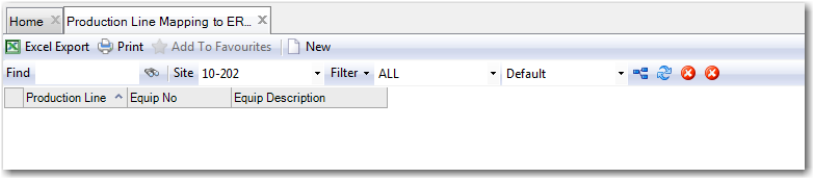
Production Line Mapping to ERP

You can also map a production line to ERP as you did the work center.

Note You can map an equipment instance to either a work center or a production line, or both; however, it is not required that you map both. It is only necessary to map EAM machines to ERP work centers if the item that is scheduled on the production line has a routing that contains the ERP mapped work center.

In Production Line Mapping to ERP, click New, then enter the workbenches production line data.

Fig. 6.3
Production Line Mapping to ERP



QAD ERP Setup

EAM data is retrieved by calling an EAM instance's AppServer. Therefore, you have to set up the workbenches server-side software so that it can call the EAM AppServer. You can do this at any time. The EAM Integration functionality remains inactive until you set it up.

To define this, use the following procedure:

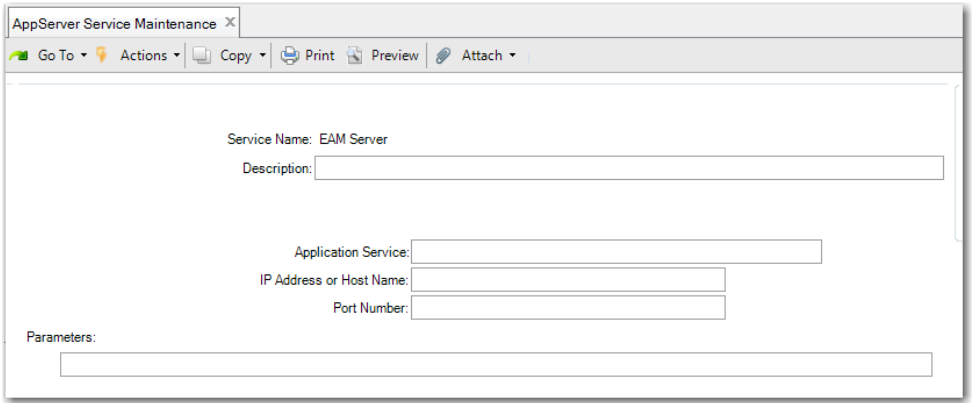
- Define the EAM AppServer in QAD ERP by creating an entry using AppServer Service Maintenance (36.19.1).
- Define the AppServer Service Name to be used for calling the EAM AppServer by using Workbench Control File (22.20.24).

AppServer Service Maintenance

To set up an entry in AppServer Service Maintenance, use the following procedure:

1. Enter the internal name of the application server connection in the Service Name field.
2. In the Application Service field, enter the Progress application service name supplied as the AppServer parameter when connecting to the application server. This is the EAM instance AppServer name.
3. In the IP Address or Host Name field, enter the value supplied as the -H parameter when connecting to this application server. This is the host name or IP address of the machine on which the application server is running.
4. In the Port Number field, enter the port number supplied as the -S parameter when connecting to this application server. This is the port number of the Progress named server that is hosting the application server.
5. Enter any additional parameters required in the Parameters field.

Fig. 6.4
AppServer Service Maintenance (36.19.1)



Workbench Control File

To set up the Workbench Control File, use the following procedure:

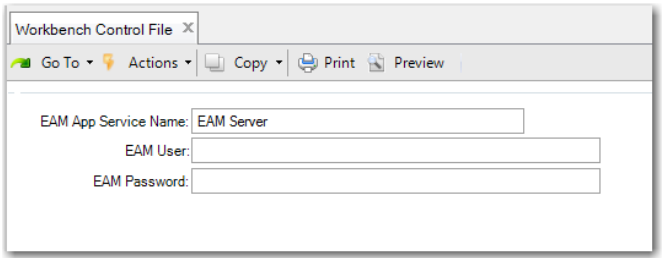
1. In QAD ERP, access Workbench Control File (22.20.24).
2. Enter the name of the AppServer service name entered in AppServer Service Maintenance (36.19.1) in the EAM AppService Name field.
3. Enter a user ID in the EAM User field.

   This is used to authenticate with the EAM API.
4. Enter a password in the EAM Password field.

   This is used to authenticate with the EAM API.

If the entry created in AppServer Service Maintenance has wrong values or there are other technical problems encountered in trying to connect to or make calls to the EAM AppServer, the system generates AppShell exceptions. The exception data contains information about the operation being attempted and the failure reasons.

Fig. 6.5
Workbench Control File (22.20.24)



EAM 12.5 Setup

Important The interface between EAM and the workbenches is only operational with EAM version 12.5, which is currently in Early Adopter status. The instructions provided in this section do not apply to earlier versions of EAM. Contact your QAD account representative for more information.

You should follow the setup steps of the EAM process chart in .NET UI to set up EAM. For most of the steps, refer to the System Administration chapter of the EAM user documentation.

In EAM, ensure that you have the following set up:

- In System Administration|System Control under the MFG/PRO Options tab, check the MFG/PRO Interface field to use QAD ERP with EAM. Set the remaining fields to interact with the QAD DB.
- In General|Business Units|Domain, ensure that you have the QAD ERP entity and Domain for the workbenches defined in EAM.

  Note In the EAM Domain record, you can set up workbenches bill-to and ship-to addresses in the MFG/PRO Integration tab. You can check the EAM Bill-To and Ship-To Downloads modules to get a list of the bill-to and ship-to addresses.
- In General|Business Units|Sites, ensure that you have a site for the workbenches. You may have to set up a new site, which you can then optionally set to be the primary site.
- In System Administration|User/Roles, set up a user role for the workbenches site. You may have to set up a new user/role.
- In System Administration|Roles, copy the attributes of a system administrator role to the new user role you created for the workbenches site.
- In Work Order Status Maintenance, define the EAM Work Order Status that the system pulls into the QAD ERP workbenches by selecting either Manufacturing Scheduling Active or Manufacturing Scheduling Closed. The system displays only those work orders that have a status indicating Manufacturing Scheduling Active or Manufacturing Scheduling Closed in the workbenches.

  Note The gray EAM hammer and screwdriver icon displays in the schedule grids when there is at least one EAM work order with a status indicating Manufacturing Scheduling Closed. The red EAM hammer and screwdriver icon displays when there are EAM work orders with a status indicating Manufacturing Scheduling Closed and at least one EAM work order with a status indicating Manufacturing Scheduling Active. Orders found for either icon type display in the EAM Repair Orders tab.
- In Work Order|Clearances, define the clearance codes assigned to work orders in EAM that you want the QAD ERP to recognize. For the workbenches to consider displaying an EAM order on the workbenches, the system looks at the clearance code.

  Note The system examines only those work orders that have a clearance code indicating Manufacturing Impact; so, when all work orders have a clearance code with Manufacturing Impact not set, then EAM icons or work orders do not appear in the workbenches.
- In System Administration|Mandatory Fields, set the clearance code as a mandatory field. Select the field using the Mandatory Field Browse, then double-click on it, and ensure that Mandatory is checked.
- In Equipment|Preventive Maintenance (PM), select the Codes tab, then enter hours in the Est Hours Down field.

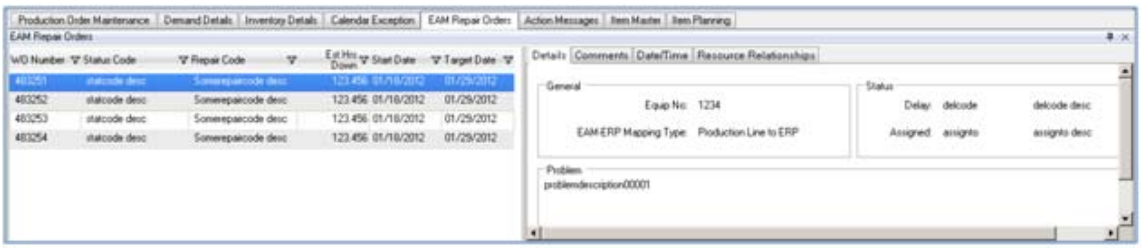
Testing the Setup

You can test the EAM-workbenches integration setup by going to EAM, then Work Orders. Select your equipment (work center) then try creating a work order for the work center. You must set these important workbenches-related fields:

- Estimated down start date and time within your MSW/PSW scheduling start and end dates
- Equipment number
- Clearance Code has to indicate Manufacturing Impact

When you create the work order in EAM, then save it, you should see the order in the workbenches EAM Repair Orders tab; see Figure 6.6.

Fig. 6.6
Work Order Status



Workbenches EAM Features

Functions within the workbenches let you:

- List EAM orders that are associated with the MSW/PSW resource.
- Display attributes and details of EAM work orders.
- Display EAM order comments.
- Display date and time attributes of EAM orders; for example, indicate estimated start and end downtimes.
- Indicate the production lines or work centers that are associated with the MSW/PSW resource. For example, when the schedule context is for work center 100, the production lines that are associated with work center 100 are listed in the EAM Repair Orders Resource Relationships grid.

The following topics provide more information on EAM functions and features within the workbenches.

EAM Visual Indicators

The Planning and Scheduling Workbenches let you know of the presence of EAM orders by displaying icons in the Remaining Capacity row of the Capacity Grid. There are two different icons that can display depending on the status of the associated EAM orders. The icons can display in any of the cells in the row, depending on whether there are EAM repair orders with particular attributes for that date.

The icons display in the Capacity Grid to let you know that there are EAM orders that might affect manufacturing capacity; however, there is no actual reduction in capacity in the workbenches. You determine when EAM orders impact the capacity and by how much.

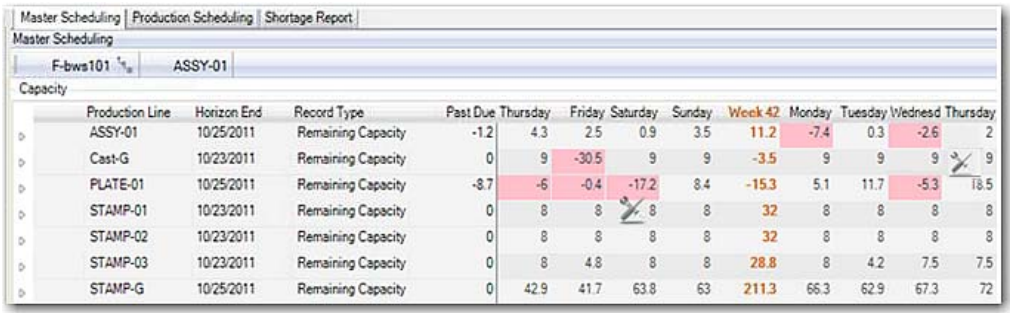
Table 6.1
Visual Indicator Summary

Indicator	Meaning
	There is at least one closed EAM order and no open EAM orders for that date.
	There is at least one open EAM order for that date.

When more than one EAM record exists on the same release or due date with different statuses, the system displays the most severe icon. In most cases, this is the active or red icon indicator. For example, EAM order A has a start date of Monday and a closed status. EAM order B has a start date of Monday and an open status, so the system displays the EAM icon per EAM order B.

The following depicts the icons in the Capacity Panel.

Fig. 6.7.
EAM Icons



Production Line	Horizon End	Record Type	Past Due	Thursday	Friday	Saturday	Sunday	Week 42	Monday	Tuesday	Wednesd	Thursday
ASSY-01	10/25/2011	Remaining Capacity	-1.2	4.3	2.5	0.9	3.5	11.2	-7.4	0.3	-2.6	2
Cast-G	10/23/2011	Remaining Capacity	0	9	-30.5	9	9	-3.5	9	9	9	9
PLATE-01	10/25/2011	Remaining Capacity	-8.7	-6	-0.4	-17.2	8.4	-15.3	5.1	11.7	-5.3	18.5
STAMP-01	10/23/2011	Remaining Capacity	0	8	8	8	8	32	8	8	8	8
STAMP-02	10/23/2011	Remaining Capacity	0	8	8	8	8	32	8	8	8	8
STAMP-03	10/23/2011	Remaining Capacity	0	8	4.8	8	8	28.8	8	4.2	7.5	7.5
STAMP-G	10/25/2011	Remaining Capacity	0	42.9	41.7	63.8	63	211.3	66.3	62.9	67.3	72

Searching for EAM Data

You can use the range of the History and Future Horizon in User Preferences. The system pulls orders based on the EAM order estimated downtime start date. The following topics provide more information on the two workbenches fields:

History Horizon. The workbenches pull active past due EAM maintenance orders to the workbenches, regardless of what you define for this field. They pull closed EAM orders per the value you define here.

Future Horizon. The workbenches pull active and closed EAM maintenance orders, based on the EAM order estimated downtime start date (not the EAM order release date).

Example You set the History Horizon to 10 days. The system displays all active/closed EAM orders through 10 days in the past. You set the Future Horizon to 10 days. The system displays all active or closed EAM orders through 10 days into the future.

Retrieved EAM Data

The system retrieves EAM work orders for the workbenches when the EAM work orders:

- Have an estimated downtime start date within the workbenches history and future horizon
- Have a clearance code that indicates manufacturing impact
- Refer to an equipment instance that has one of these types of mapping to the QAD ERP resource selected in the workbenches:

- A direct mapping—EAM maps equipment instances to the resources selected in the MSW/PSW.
- An indirect mapping—EAM maps equipment instances to work centers which in turn are associated with production lines selected in the MSW/PSW.

Working with EAM Repair Orders

The Planning and Scheduling Workbenches display information about EAM repair orders. This information is displayed in the EAM Repair Orders tab at the bottom of the workbenches; see Figure 6.8. The panels that display are split into two major sections, much like the display for production orders.

The left panel displays a summary of EAM orders that are associated with the resource (work center or production line) that is currently in context. The columns displayed are:

- Order ID
- Order status code description

  Note The Status field is in EAM Work Order|Equipment.
- Repair code description

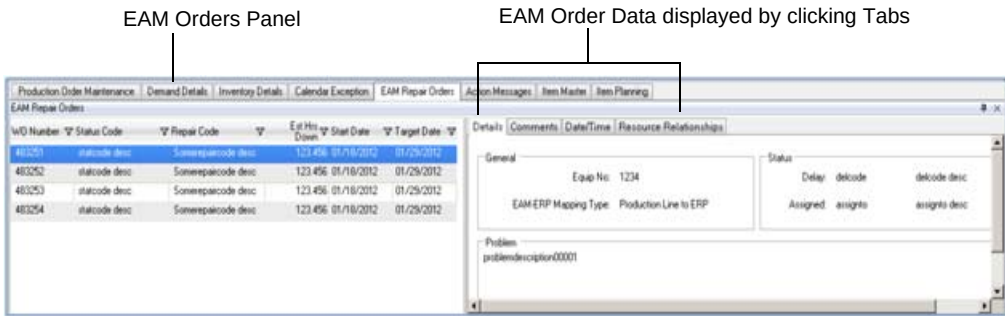
  Note The Repair field is in EAM Work Order|Codes.
- Estimated hours down.

  Note The Est Hours Down field is in EAM PM|Codes.
- Start date and target date

  Note The Start and Target Date fields are in EAM Work Order|Equipment.

The right panel displays various data, depending upon which tab you select. The topics following the graphic describe the data available through each tab.

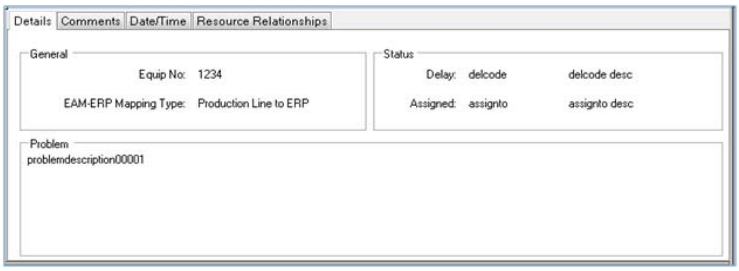
Fig. 6.8.
Workbenches Repair Orders Tab



Details Tab

When a particular order is selected in the EAM Orders grid, this tab will display attributes of the order in a form.

Fig. 6.9.
Workbenches Repair Orders Tab



Equip No. The EAM equipment number.

EAM-ERP Mapping Type. Can be either Production Line to ERP or Work Center to ERP.

Delay. The code and description for the reason why the EAM order is delayed.

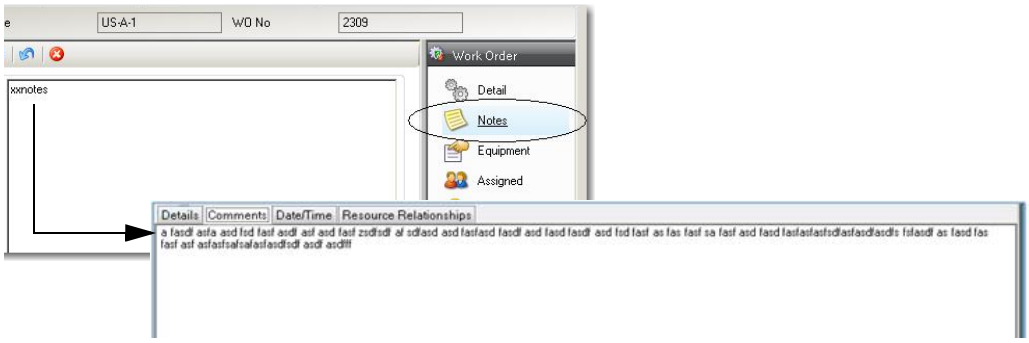
Assigned. The repair technical code and name, assigned to the repair order. This is from the Assigned field in the EAM work order.

Problem. The problem statement.

Comments Tab

Use the Comments tab to view EAM order comments. The comments are from the EAM work order Notes feature in EAM Work Order Maintenance. Figure 6.10 shows the workbenches comments tab; it also shows the Notes section of the EAM work order from which the comments emanate.

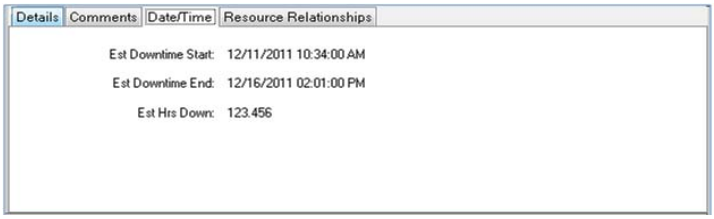
Fig. 6.10.
Comments Tab



Date/Time Tab

This shows date/time attributes of the EAM order.

Fig. 6.11.
Date/Time Tab



Est Downtime Start. The estimated downtime start date and time of the EAM order.

Est Downtime End. The estimated downtime end date and time of the EAM order.

Est Hrs Down. The estimated downtime in hours of the EAM order.

Resource Relationships Tab

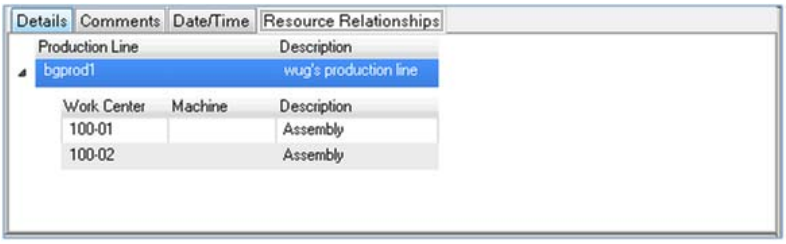
This shows the production lines or work centers that are associated with the MSW/PSW resource in context. The resource in context is the particular resource you select in the MSW/PSW either from the Navigator or by clicking a row in the Schedule Grid. For a resource in context:

- When it is a production line, then its related work centers are listed. This relationship is established because production lines reference work orders, and work order routing details reference work centers.
- When it is a work center, then its related production lines are listed. This relation is established because work centers reference work order routing details, and work orders reference production lines.

This information lets you know which resources might be affected when there are EAM work orders for a related resource.

In the following screenshot, the production line `bgprod` is in context and the work centers that are associated to it are listed below.

Fig. 6.12.
Resource Relationships Tab



Appendix A

Troubleshooting, Tips, and Errors

Use this appendix when issues arise in functionality.

Overview 130
Presents an overview of the type of information found in this appendix.

Errors 134
Describes errors that can display in the workbenches and provides solutions or workarounds to correct them.

Overview

The PSW, MSW, CAC, and other workbench features play a crucial role in your day-to-day scheduling operations. So when problems occur or issues arise, your workday is affected, and this, in turn, indirectly affects production.

You can take a number of basic steps to solve workbench problems on your own, or, at the very least, narrow down their causes. So the next time you encounter a misbehaving function, try performing the troubleshooting tips in this appendix.

You can also document the steps you take; that way, if a tech-support call becomes inevitable, you can eliminate what is not causing the problem.

Item Number Displays, but Not Planned Orders

For a production line, the item number displays on the workbench, but none of the MRP planned orders for the item display.

Assumptions:

- MRP planned orders exist for the item number.
- The item number is defined as an L(ine) type item in Item Planning Maintenance (1.4.7).
- The item is set up on a production line.

Possible Causes

You defined a production line for an item after you ran MRP. The planned order created by MRP does not have the planned orders assigned to the production line.

You define the item on two or more production lines. The production line you are viewing is NOT the primary production line. Planned production orders are only defaulted on the primary production line.

Solution

Check primary production line for item. Regenerate MRP.

Repetitive Scheduled Order S Type Not Created

For a production line, you firm a planned order, but the system did not create a repetitive, S-type, scheduled order.

In MSW, it is possible to schedule a discrete production order on a production line.

Assumption: The item is set up on a production line.

Possible Causes

The item number is not defined in the item master (site master) as a Pur/Mfg item of L type.

Solution

Set the Pur/Mfg code to L in Item Data Maintenance (1.4.1). Pur/Mfg codes other than L default the firmed order as a discrete order.

Item Does Not Display in MSW

In MSW, the item for the order does not display.

Possible Causes

The item does not have a routing defined for it.

The item does not have active supply and demand in the scheduling horizon you specified. Items that display in the MSW Schedule Grid that fall within the search criteria have supply and demand data for them. Items without supply and demand data do not display in the workbenches.

Solution

Set up a routing for the item in Routing Maintenance (14.13.1) and generate a work order routing for a work order containing this item. This creates the records needed to show the item in the Planning and Scheduling Workbenches.

If a routing is defined, alter the scheduling horizon through the Options pull-down menu by selecting Preferences, then the Search tab in the Planning and Scheduling Workbenches.

Item Does Not Default as a Repetitive Scheduled Item

On a production line, the item does not default as a repetitive scheduled item.

Possible Cause

The Pur/Mfg code is not set to L for the item master.

Solution

Set the Pur/Mfg code to L in Item Master Maintenance (1.4.1).

MSW-Selected Item Does Not Display in PSW

Possible Cause

A filter has been applied to the MSW/PSW that hides a production line or item that is visible on one frame/grid and not another. The system will still select/focus on the item record, even if not visible.

Also, the sequencing horizon may be less than the MSW scheduling horizon.

If you are viewing items on a work center resource, the setting of the Pur/Mfg field does not have an impact on this issue; however, setting the BOM and routing does have an impact. Likewise, BOM/routing does not impact viewing an item on the production line, but the setting of the Pur/Mfg field does.

Solution

Remove the filter. The selected record displays as selected.

Change the horizons through the Options pull-down menu by selecting Preferences, then the Search tab in the Planning and Scheduling Workbenches. Verify that for both work center and production lines, there is an active supply/demand for the item within the search history/future horizon.

If viewing items on a production line, set the Pur/Mfg field to L in Item Data Maintenance (1.4.1).

Some Workbench Grids Do Not Show Past Due Data

The Schedule Grid, Supply/Demand Grid, and Capacity Grid do not show data related to past due orders.

Probable Cause

The Schedule Grid, Capacity Grid, and Supply/Demand Grid only show data related to past due orders when they are within the setting of the History Horizon field in the Search window of the Preferences option.

Solution

If you see past due orders but not the detail related to them, expand the history horizon value to see the related data (supply, demand, and so on).

Also, the Production Order Maintenance window within the workbench shows past due orders. Past due open production orders display first, regardless of the history horizon setting you have selected in your user preferences.

Item Highlighted in Red in MSW but No Shortage

The system highlights an item in red for a POH issue in the MSW workbench, but there are no shortages within the production line's scheduling horizon end date.

Probable Cause

This occurs because the item that is on that particular resource is also on other resources in the Schedule Grid. When this is the case, the system looks at the number of firm scheduling days for all resources for which the item is scheduled in the grid; then, it selects the number of firm days that is the highest to associate with the item. So, even though the specific work center that is highlighted may have zero (0) firm scheduling days, another resource for which the item is

scheduled may have, for example two firm scheduling days, so the system uses the two firm scheduling days for the item status for the item, regardless of the resource with which the item is paired.

Solution

No solution required.

Completed Production Order and Item No Longer Display on Workbench

The MSW displays completed production orders where the production order due date is within the history/future horizon that you define through the Options pull-down menu by selecting Preferences, then the Search tab in the Planning and Scheduling Workbenches. When the item you produced has no other active supply/demand records (mrp_det) records, the item/order no longer displays on the workbench.

Probable Cause

If an item has no mrp_det records in the system for any of the sites, then that item and its production orders do not display. For example, if you have an item with just one production order in the system, and you receive the production order but do not close it, the production order can have a zero open quantity but an exploded status. Normally, the order displays as a search result, but once the production order was fully received, the system deleted the mrp_det record for that order. Since that was the only production order for the item and no other mrp_det records exist, that item and the order do not display.

Item Does Not Display in MSW

Item does not display on a repetitive production line in the MSW.

Probable Cause

An item does not display in the MSW when:

- It does not have a routing/BOM defined.
- It does not have active supply/demand in the horizon you are viewing.

When you add an item to the production line, the system displays warnings when the routing or BOM does not exist for the item. Also, the system displays a warning when the item is not set as a repetitive manufactured item in item planning records.

Solution

In Item Planning Maintenance (1.4.7) or Item Data Maintenance (1.4.1), set the Purchase/Manufacturer code for the item to L.

Note If the message displays because you are scheduling discrete orders on a production line or working with items that may only be manufactured discretely, you can overlook the warning and continue processing.

Ensure that a routing exists in Routing Maintenance (14.13.1) and that a product structure (BOM) exists in Product Structure Code Maintenance (13.1).

Cannot Delete an E Status Co-/By-Product Order

You cannot delete an E(xploded) status co- or by-product order.

Problem

When you attempt to delete a co/by-product order with an E status, the system displays an error message during a subsequent save that informs you that you must perform a work order accounting close.

Solution

This is standard legacy functionality for co/by-products. When the order has an E status, you must run work order accounting close before you can delete the joint set. Or, you can set the status back to F(irm) to delete the order.

Errors

WO Record Locked By Another User

If you are working in MSW, then use QAD EE Work Order Maintenance (16.1) to edit an order that MSW receives, then return to the MSW workbench to modify the order and attempt to save the order, the system displays a red icon in the MSW and an error message, informing you the record is locked by another user.

Additionally, when Work Order Control (16.24) is locked, it may lock Production Order Maintenance, so that MSW cannot create new production orders when you leave the ID and Number fields blank. When this occurs, you may receive an error message.

Data Modified by Another User

You can receive an error message in the workbenches, indicating that another user modified data. When you receive this error while attempting to update records, the system does not let you update. You must refresh data by searching for records again before you update.

The error can display in the following situations:

- You are saving several orders in the workbenches; however, one record is open in the CHUI version of QAD EE.
- You open a production order record in MSW, then change that same production order in another program. After, you attempt to update the order along with several others in MSW and click save.
- You make changes as described above but from one of the following tabs: Detail, Comments, Date/Time, and Compliance.

- You open a planned order in the Production Order Maintenance window, delete demand, run MRP so that the system deletes planned orders, then save the planned order.
- You open a planned order, change demand so that the system creates new planned orders, run MRP, then save the planned order.

System Unable to Process Request

The system can display a message indicating that it cannot process a request. This can occur, for example, when the system is retrieving a large number of records for a search. When this happens, check the log file. Typically, the system cannot process requests because it has run out of memory.

When this occurs, try any or all of the following:

- Reboot the PC to clear memory usage.
- Change the search criteria to extract less data.
- Upgrade the PC with more memory 4 GB or more.

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