

MODULE 13: ADVANCED CAPACITY

Module Overview

"Advanced Capacity" examines the capacity setup that is required to run production planning with constrained resources. You plan with constrained resources when bottlenecks appear in the production environment.

First, set up the work center group, work center, and machine center hierarchy. Then define the shop calendars and capacity calendars. This establishes the base capacity for each work center or machine center.

Next, register planned absences for each facility. This helps the program calculate accurate capacity calendars for each facility. Finally, you consume capacity through either posting of production order operations, or directly to facilities through entries in the capacity journal.

Before starting the lessons in this module, set your work date to January 23, 2014. Please perform all lessons, demonstrations, and labs in sequence.

Objectives

The objectives are:

- Explain how to set up work centers and machine centers.
- Show how to set up shop calendars and capacity calendars.
- Describe registered absences and how to use them.
- Explain how to use capacity journals.

Capacity Resources

The first step in capacity planning is to set up capacity resources or facilities. You can define the following types of facilities in the program:

- Work center groups
- Work centers
- Machine centers

Work Center Groups

The top level of the hierarchy is the *work center group*. Work center groups are broad departments in an organization. A work center group is a reporting unit, such as a production or inventory department, instead of a facility where you schedule work. A company must set up at least one work center group, but can also use multiple groups.

Work Centers

Work centers are specific locations where you schedule work. You can set up work center cards for the following:

- A machine
- A group of machines
- A group of people

You schedule production order operations in work centers through routings. Work centers can have machine centers on a discrete basis, or the machine centers can roll up to represent the work center's capacity by using the consolidated calendar. By structuring production routings at the machine center, companies can view the load at both a specific machine center and at an aggregate level for the work center.

You assign each work center to one work center group. The work center group calendar is the sum of all calendars of all work centers that are assigned to it. If you use machine centers, the total capacity of the work center is the sum of the capacity of all the machine centers that are assigned to it.

Machine Centers

Machine centers are specific locations where you schedule work. They are the lowest level of the capacity hierarchy and represent the following:

- A machine
- A group of machines with identical characteristics
- A person
- A group of people who perform the same task

You schedule production order operations in machine centers through routings. A company can define the extent to which a machine center focuses. Typically, only those resources that have to be monitored, or are frequent bottlenecks, are designated as machine centers. When you schedule a production order operation in a machine center, it consumes capacity. A machine center has only its own capacity, because there are no other facilities that are defined below it in the hierarchy.

You must assign each machine center to a work center. Machine centers are an option and are not required for manufacturing.

Work Center Card

The *work center card* contains all the fields that define a work center. To review the work center card, follow these steps.

1. In the **Search** box, type “work centers”, and then select the related link.
2. On the **Work Centers** list page, double-click the line for work center 100, Assembly department.

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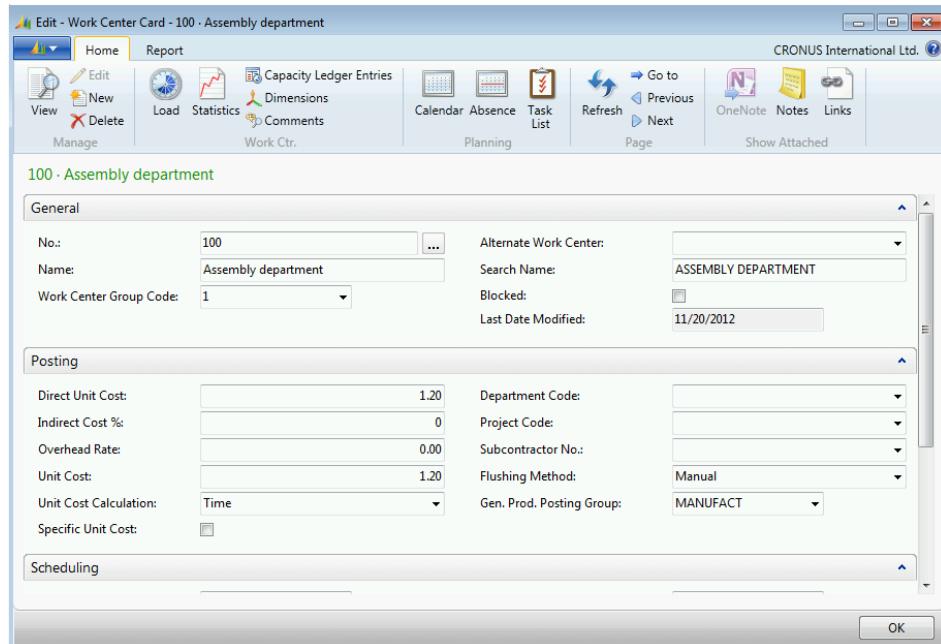


FIGURE 13.1:WORK CENTER CARD

The following sections describe the relevant fields on each FastTab on the work center card.

General FastTab

Field	Description
No.	Specifies the work center number. You can enter this manually or have the program fill in the number automatically. The number must be unique.
Name	Specifies the name of the work center. You can use no more than 30 characters, both numbers and letters. The name prints on documents. You should therefore enter the name as you want it to appear.
Work Center Group Code	Specifies the work center group to assign to the work center. To select a work center group code from the available work center groups, click the drop-down arrow.

Field	Description
Alternate Work Center	Specifies an alternate work center. You can use this alternate work center if the current work center is not available. This entry is for information purposes only and is not automatically processed.
Search Name	Specifies the search name for the work center. You can use this field to search for a work center when you cannot remember the work center number. The search name starts as a copy of the work center name. However, you can change it. You can use no more than 30 characters, both numbers and letters.
Blocked	Specifies whether the work center is blocked. If you block a work center, you cannot post to it. You can select this field if the work center is not operational.
Last Date Modified	Specifies the last modification date for the work center. The program automatically updates this field.

Posting FastTab

Field	Description
Direct Unit Cost	Specifies the direct unit cost of the work center at one unit of measure. You define the unit of measure in the Unit of Measure Code field on the Scheduling FastTab. Direct unit costs are sometimes known as the <i>direct labor rate</i> .
Indirect Cost %	Specifies the indirect costs of the work center as a percentage of direct unit costs. Indirect costs are costs that you cannot directly assign to a unit, for example, the general operating costs of the work center. Indirect costs are added to direct unit cost to help calculate the unit cost.

Field	Description
Overhead Rate	<p>Specifies the overhead rate for the work center. The overhead rate is an absolute amount. You can set up the overhead rate to cover expenses other than material and capacity costs, for example, the maintenance expenses for the work center. The unit cost for a work center includes the overhead rate.</p> <p>The unit of measure for the overhead rate is set in the Unit of Measure Code field on the Scheduling FastTab, or per unit, depending on the entry in the Unit Cost Calculation field.</p>
Unit Cost	<p>Specifies the unit cost at one unit of measure for the machine center. You set the unit of measure code in the Unit of Measure Code field on the Scheduling FastTab. Unit cost is calculated by the formula: <i>direct unit cost + (indirect cost % * direct unit cost) + overhead rate = unit costs</i>.</p> <p>The basis of the unit cost calculation is the usage quantity per time interval that is set in the Unit of Measure Code field on the Scheduling FastTab, or per unit, depending on the entry in the Unit Cost Calculation field.</p> <p>Although you can enter a unit cost directly in the Unit Cost field, we recommend that you use the other costing fields.</p>
Unit Cost Calculation	<p>Specifies whether to calculate unit costs based on one of the following two options:</p> <ul style="list-style-type: none"> • Time – Bases the calculation on the time that is used. • Units – Bases the calculation on the number of units that are produced.

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Field	Description
Specific Unit Cost	Specifies where you can define the unit costs. If you select this field, you can define the unit costs in the Unit Cost Per field on each routing line. If you clear this field, costs are based on the work center's Unit Cost field.
Department Code	Specifies one of two dimension value codes for the work center. The program fills in this field by using the value in the Global Dimension 1 field on the General Ledger Setup page.
Project Code	Specifies one of two dimension value codes for the work center. The program fills in this field by using the value in the Global Dimension 2 field on the General Ledger Setup page.
Subcontractor No.	<p>Specifies the vendor number of a subcontractor that supplies this work center. This field is used to administer external work centers that process work under contract.</p> <p> Note: We recommend that you do not specify a subcontractor work center as the last operation in a routing. This automatically posts the production order as finished when you receive the associated purchase order. Most companies prefer to validate the subcontractor's work first. The automatic posting of the production order also results in some functional limitations if you still have to post other operations.</p>

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Field	Description
Flushing Method	<p>Specifies the method that is used to calculate the output quantity for production order operations at this work center. Because facilities control posting of finished goods, you must consider the flushing method carefully. The three options are as follows:</p> <ul style="list-style-type: none">• Manual – Post the output manually by using the output journal.• Forward – Have the program automatically calculate and post the output when you change the status of a simulated, planned, or firm planned production order to Released. The program uses the quantity on the production order line as the output quantity. You can still post output manually by using the output journal, if it is necessary.• Backward – Have the program automatically calculate and post the output when you change the status of a released production order to Finished. The program uses the quantity on the production order line as the output quantity. You can still post output manually by using the output journal, if it is necessary.
Gen. Prod. Posting Group	Specifies a general product posting group. Combined with the general business posting group, the general product posting group specifies the general ledger accounts that are posted when you post sales orders or purchase transactions. The inclusion of this field on the work center card is primarily for costing purposes.

Scheduling FastTab

Field	Description
Unit of Measure Code	<p>Specifies a unit for production at the work center. For example, if you specify minutes here, the program calculates all capacity planning and costing values for the work center in minutes. This selection also applies to any machine centers that are assigned to the work center. The following options are available:</p> <ul style="list-style-type: none"> • Minutes • Hours • Days • 100/hour
Capacity	<p>Specifies the capacity of the work center. Generally, the capacity is how much work that the work center can finish in a specified time. The capacity of a work center refers to how many machines or people work in the work center at the same time. If you type "2" in this field, the work center can finish double the work in the same time. Expressed another way, if a work center's availability is eight hours, and you specify a capacity of two, then the total availability is 16 hours.</p> <p>The program uses this field when you run the Calculate Work Center Calendar batch job to calculate the capacity calendar. For more information about calendars, refer to the "Work Center and Machine Center Calendars" lesson.</p>

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Field	Description
Efficiency	<p>Specifies the efficiency rate as a percentage of the work center capacity. The efficiency measures the output of a work center in relation to the expected standard output. It therefore indicates the degree of utilization of the work center.</p> <p>For example, if a work center's capacity is eight hours, and you specify an efficiency of 90 percent, the net capacity for the work center is 7.2 hours.</p> <p>The program uses this field when you run the Calculate Work Center Calendar batch job to calculate the effective capacity in the capacity calendar. For more information about calendars, refer to the "Work Center and Machine Center Calendars" lesson.</p>
Consolidated Calendar	<p>Specifies whether to use the consolidated calendar. If you select this field, then the work center has no capacity of its own. Instead, its capacity is equal to the sum of the capacities of all the machine centers that are assigned to the work center.</p> <p>For example, if you select this field, and the work center has two machine centers assigned to it, each with a capacity of eight hours, the work center's capacity is 16 hours. If you do not select this field, the work center's capacity is based on values that are specified on the work center card.</p> <p>Use this field when you structure your routings to schedule production operations at the machine center level. When you consolidate the calendar, the Work Center Load page and reports become an overview of the aggregate load in all machine centers that are assigned to the work center.</p> <p>For more information about calendars, refer to the "Work Center and Machine Center Calendars" lesson.</p>

Field	Description
Shop Calendar Code	Specifies the shop calendar on which to base the capacity calendar for the work center. For more information about calendars, refer to the "Work Center and Machine Center Calendars" lesson.
Queue Time	<p>Specifies the queue time for the work center. The queue time indicates the expected time that a part must wait at a work center before processing starts. For example, if a part arrives at a work center at 10:00:00 AM, but processing does not start until 12:00:00 AM, then the queue time is two hours. Expressed another way, the queue time represents the time between when the previous routing operation is finished and when the routing operation at this work center starts.</p> <p>The queue time always refers to the time unit of measure that you enter in the Queue Time Unit of Meas. Code field.</p> <p>The value of the Queue Time field on a machine or work center, plus the sum of the values in the Setup Time, Run Time, Wait Time, and Move Time fields on the item routing line, combine to represent the production lead time of the item.</p>
Queue Time Unit of Meas. Code	Specifies the queue time unit of measure code. For example, if you select minutes here, then typing "40" in the Queue Time field means that there is a 40 minute wait.

The **Location Code** field on the **Warehouse** FastTab is also relevant to the basic setup of a work center. By default, this field specifies the location where the work center operates. If a production order at the same location uses the work center, then warehouse activities that are related to consumption and output are defined by the work center setup. The location code that is defined in this field also applies to any underlying machine centers.

Demonstration: Set Up a Work Center

Scenario: Eduardo, the production planner at CRONUS International Ltd, decides to set up a new work center to represent the Finishing Department.

Demonstration Steps

1. Set up the work center.
 - a. Close all open pages.
 - b. In the **Search** box, type "work centers", and then select the related link.
 - c. On the **Home** tab of the **Work Centers** list page, click **New**.
 - d. On the **General** FastTab of the work center card, in the **No.** field, type "600".
 - e. In the **Name** field, type "Finishing Department".
 - f. In the **Work Center Group Code** field, select 2, Production department.
 - g. Expand the **Posting** FastTab.
 - h. In the **Direct Unit Cost** field, type "1.00".
 - i. In the **Unit Cost Calculation** field, select Time.
 - j. In the **Flushing Method** field, select Manual.
 - k. In the **Gen. Prod. Posting Group** field, select NO VAT. Note that this selection depends on your accounting setup.
 - l. Expand the **Scheduling** FastTab.
 - m. In the **Unit of Measure Code** field, select MINUTES.
 - n. In the **Capacity** field, type "1".
 - o. In the **Efficiency** field, type "100".
 - p. In the **Shop Calendar Code** field, select 1 for a single eight-hour shift from Monday to Friday.
 - q. Click **OK** to close the work center card.

Machine Center Card

The machine center card contains all the fields that define a machine center. To review the machine center card, follow these steps.

1. In the **Search** box, type "machine centers", and then select the related link.
2. On the **Machine Centers** list page, double-click the line for machine center 110, Mike Seamans.

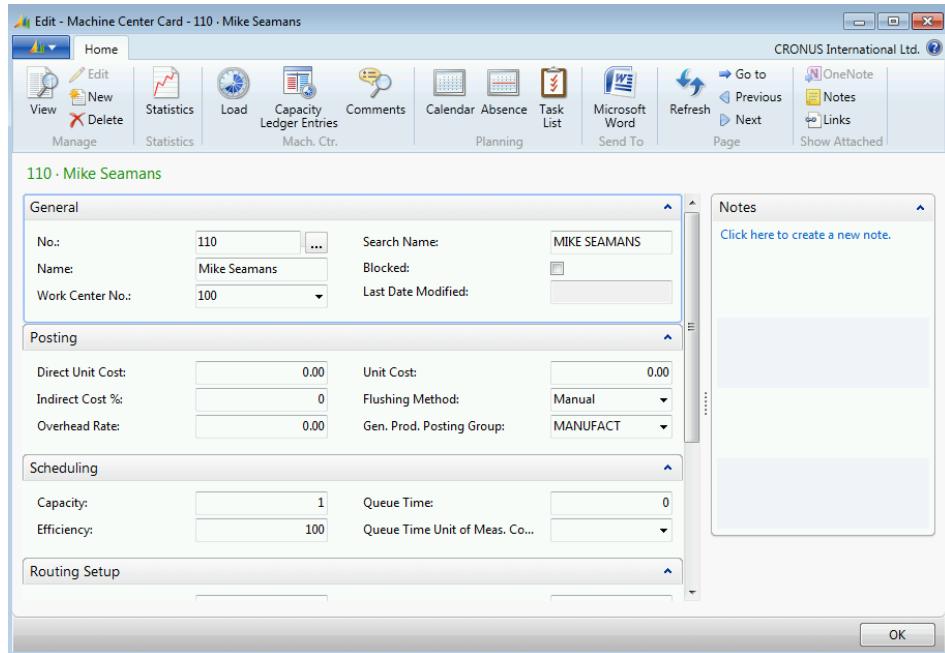


FIGURE 13.2:MACHINE CENTER CARD

Many of the fields on the machine center card have the same definition as those on the work center card, except that their values apply to the machine center. The following sections include additional notes for the fields on each FastTab.

General FastTab

The machine center card contains a **Work Center No.** field. This field identifies the work center to which the machine center is assigned.

Posting FastTab

The fields on this FastTab identify direct and indirect costs, similar to the fields that have the same names on the work center card. In addition, you can specify a flushing method for time and quantity for routing operations that use this machine center.

Scheduling FastTab

Similar to work centers, both capacity and efficiency affect the total availability of the machine center. To calculate the availability of a machine center, the program uses the values of the **Capacity Unit of Measure** and **Shop Calendar Code** fields

Routing FastTab

The fields on the **Routing Setup** FastTab exist only for machine centers. The following table describes these fields.

Field	Description
Setup Time	Specifies how long it takes to set up the machine center. The setup time is the time that is required for the machine center to convert from the production of the last good piece of item A to the first good piece of item B.
Wait Time	Specifies the wait time. The wait time is the time that a production lot remains at the machine center after an operation is finished, until the lot moves to the next operation.
Move Time	Specifies the move time. The move time is the time that a lot spends in transit from the previous operation to the current operation at the machine center.
Fixed Scrap Quantity	Specifies the fixed scrap quantity. A fixed scrap quantity is the absolute part of the expected scrap for an operation at the machine center. The program considers the fixed scrap quantity when it calculates production order needs.
Scrap %	Specifies the scrap in percent. A percentage of scrap is the relative part of the expected scrap for an operation at the machine center. The program considers the scrap percentage when it calculates production order needs.

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Field	Description
Send-Ahead Quantity	<p>Specifies the send-ahead quantity. The send-ahead quantity is the minimum quantity that you must process in an operation before you can start the next operation. If you enter a quantity in this field, the program overlaps the operation at the machine center with the next operation.</p> <p>For example, if an operation requires machine center A to process 100 parts, and the send-ahead quantity is 10, then the next operation can start as soon as machine center A finishes 10 parts.</p>
Minimum Process Time	<p>Specifies the minimum process time for the machine center. The minimum process time is the minimum time that a machine center requires to start processing. This field is for information only.</p>
Maximum Process Time	<p>Specifies the maximum process time for the machine center. The maximum process time is the maximum time that a machine center requires to start processing. This field is for information only.</p>
Concurrent Capacities	<p>Specifies how much available capacity can be planned at the same time for one operation at this machine center. You must not enter a value that is greater than the value in the Capacity field on the machine center card.</p> <p>For example, if you set the concurrent capacities to "2", this means that work can be finished in half the time.</p>

Except for the **Minimum Process Time** and **Maximum Process Time** fields, the program copies the values from all other fields on this FastTab to a routing line when you specify the machine center as the facility for that line. However, you can change this on the routing line, if it is necessary.

Demonstration: Set Up a Machine Center

Scenario: Eduardo, the production planner at CRONUS, now sets up the Finishing machine center and assigns it to the Finishing Department work center.

Demonstration Steps

1. Set up the machine center.
 - a. Close all open pages.
 - b. In the **Search** box, type "machine centers", and then select the related link.
 - c. On the **Home** tab of the **Machine Centers** list page, click **New**.
 - d. On the **General** FastTab of the machine center card, in the **No.** field, type "450".
 - e. In the **Name** field, type "Finishing".
 - f. In the **Work Center No.** field, select 600, Finishing Department.
 - g. Expand the **Posting** FastTab.
 - h. In the **Direct Unit Cost** field, type "1.00".
 - i. In the **Flushing Method** field, select Manual.
 - j. In the **Gen. Prod. Posting Group** field, select NO VAT. Note that this selection depends on your accounting setup.
 - k. Expand the **Scheduling** FastTab.
 - l. In the **Capacity** field, type "1".
 - m. In the **Efficiency** field, type "100".
 - n. Expand the **Routing Setup** FastTab.
 - o. In the **Setup Time** field, type "30".
 - p. In the **Scrap %** field, type "10".
 - q. Click **OK** to close the machine center card.

Work Center and Machine Center Calendars

To specify the base time that is available for work centers, you must define a shop calendar. You can define multiple shop calendars, and then apply them to individual work centers as required. This lets you schedule work centers based on different work shifts. For example, people who work in the painting area of a factory might work different hours than people who work in the assembly area.

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Machine centers use the shop calendar that is specified for the work center to which the machine center is assigned. To generate individual calendars for each work center or machine center, you define the following values:

- Capacity
- Efficiency
- Downtime (absence)

After you define these values, you can calculate the capacity calendar for the work center or machine center based on the shop calendar. For example, suppose that a shop calendar specifies that a work center is available for eight hours a day. However, you assign a capacity of 75% for the work center. The work center's capacity calendar then shows an availability of only six hours per day.

Demonstration: Set Up a Work Shift

Scenario: To prepare for creating shop calendars and capacity calendars, Eduardo, the production planner at CRONUS, first must set up a new work shift.

Demonstration Steps

1. Set up a new work shift code.
 - a. In the **Search** box, type "work shifts", and then select the related link.
 - b. On the **Home** tab on the **Work Shifts** list page, click **New**.
 - c. On the **Work Shifts** page, in the **Code** field, type "3".
 - d. In the **Description** field, type "3rd shift".
 - e. Click **OK** to close the page.

Shop Calendars

Shop calendars define the general working days and times and holiday days and times for a work shift. This general availability then is refined for each work center or machine center by using capacity calendars.

Demonstration: Set Up a Shop Calendar

Scenario: To finish the next step to define availability, Eduardo, the production planner at CRONUS, must set up a new shop calendar. This shop calendar is for the following three eight-hour shifts from Monday to Friday:

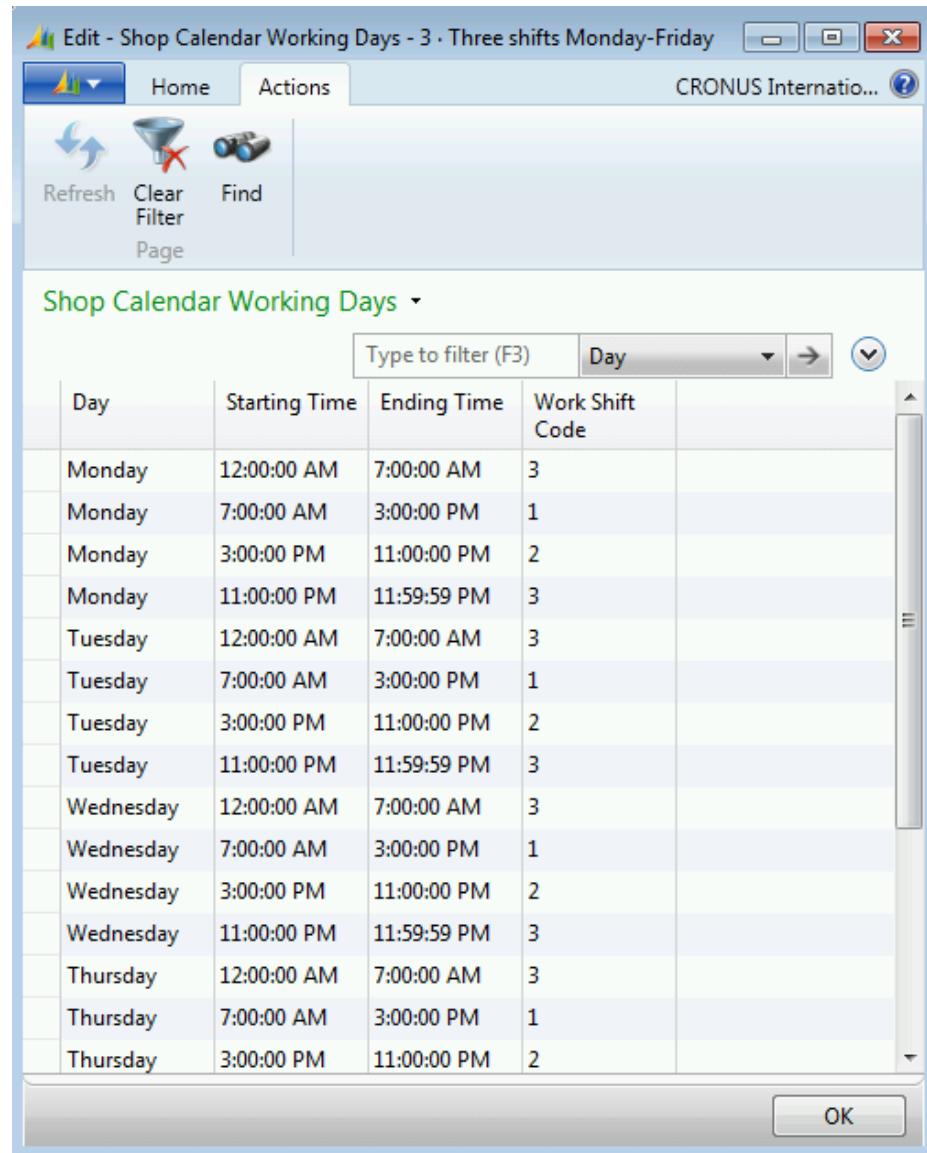
- Shift 1 – 07:00 AM to 03:00 PM
- Shift 2 – 03:00 PM to 11:00 PM
- Shift 3 – 11:00 PM to 07:00 AM the next day



Note: When the calendar time for a shift crosses midnight, you should enter the time on two lines.

Demonstration Steps

1. Create a new shop calendar code.
 - a. In the **Search** box, type "shop calendars", and then select the related setup link.
 - b. On the **Home** tab of the **Shop Calendars** page, click **New**.
 - c. In the **Code** field, type "3".
 - d. In the **Description** field, type "Three shifts Monday – Friday".
2. Define working days and times for the shop calendar.
 - a. On the **Home** tab, click **Working Days**.
 - b. On the first empty row on the **Shop Calendar Working Days** page, in the **Day** field, select Monday.
 - c. In the **Starting Time** field, type "12:00:00 AM". To enter this quickly, you can type "12A".
 - d. In the **Ending Time** field, type "7:00:00 AM". To enter this quickly, you can type "7A".
 - e. In the **Work Shift Code** field, type "3".
 - f. On the second row, in the **Day** field, select Monday.
 - g. In the **Starting Time** field, type "7:00:00 AM".
 - h. In the **Ending Time** field, type "3:00:00 PM". To enter this quickly, you can type "3P".
 - i. In the **Work Shift Code** field, type "1".
 - j. On the third row, in the **Day** field, select Monday.
 - k. In the **Starting Time** field, type "03:00:00 PM".
 - l. In the **Ending Time** field, type "11:00:00 PM".
 - m. In the **Work Shift Code** field, type "2".
 - n. On the fourth row, in the **Day** field, select Monday.
 - o. In the **Starting Time** field, type "11:00:00 PM".
 - p. In the **Ending Time** field, type "11:59:59 PM".
 - q. In the **Work Shift Code** field, type "3".
 - r. Repeat steps b to q for Tuesday, Wednesday, Thursday, and Friday.

**FIGURE 13.3:SHOP CALENDAR WORKING DAYS**

- s. Click **OK** to close the **Shop Calendar Working Days** page.

3. Define holiday days and times for the shop calendar.
 - a. On the **Home** tab of the **Shop Calendars** page, click **Holidays**.
 - b. On the **Shop Calendar Holidays** page, in the **Starting Date-Time** field, select January 01, 2014.
 - c. In the **Ending Time** field, type "11:59:59 PM".
 - d. In the **Description** field, type "New Year's Day".
 - e. Click **OK** to close the **Shop Calendar Holidays** page.
 - f. Click **OK** to close the **Shop Calendars** page.

Demonstration: Calculate Capacity Calendars

Scenario: Eduardo, the production planner for CRONUS, now calculates new capacity calendars for work center 600 and machine center 450.

Demonstration Steps

1. Calculate work center capacity calendar.
 - a. In the **Search** box, type “work centers”, and then select the related link.
 - b. On the **Work Centers** list page, double-click the line for work center 600, Finishing Department.
 - c. On the work center card, expand the **Scheduling** FastTab.
 - d. In the **Shop Calendar Code** field, select 3, Three Shifts Monday-Friday. This is the shop calendar that you just set up.
 - e. On the **Home** tab, click **Calendar**.
 - f. On the **Matrix Options FastTab** of the **Work Center Calendar** page, in the **View by** field, select Month.
 - g. On the **Home** tab, click **Show Matrix**.
 - h. On the **Actions** tab of the **Work Center Calendar Matrix** page, click **Calculate**.
 - i. On the **Options** FastTab of the **Calculate Work Center Calendar** page, set the **Starting Date** field to January 01, 2014.
 - j. Set the **Ending Date** field to December 31, 2014.
 - k. On the **Work Center** FastTab, in the **No.** filter field, select 600, Finishing Department.
 - l. Click **OK** to start the batch job. When the batch job finishes, it returns you to the **Work Center Calendar Matrix** page.
 - m. On the **Actions** tab, click **Refresh**. Notice the new values in the month columns for work center 600, Finishing Department.

No.	Name	Jan 2014	Feb 2014	Mar 2014	Apr 2014	May 2014	Jun 2014	Jul 2014
200	Packing department	11,040	9,600	10,080	10,560	10,560	10,080	11,040
300	Painting department	20,700	18,000	18,900	19,800	19,800	18,900	20,700
400	Machine department	20,700	18,000	18,900	19,800	19,800	18,900	20,700
500	Quality Inspection	20,700	18,000	18,900	19,800	19,800	18,900	20,700
600	Finishing Department	31,679.63	28,799.67	30,239.65	31,679.63	31,679.63	30,239.65	33,119.62

FIGURE 13.4:WORK CENTER CALENDAR MATRIX PAGE

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- n. On the line for work center 600, Finishing Department, drill down into the value in the Jan 2014 column. On the **Calendar Entries** page, notice that there are no entries for January 01, 2014. This is because of the New Year's Day holiday that you recorded for shop calendar code 3.

The screenshot shows a Microsoft Dynamics application window titled 'Edit - Calendar Entries - 600 Finishing Department'. The window has a toolbar with icons for New, View List, Edit List, Delete, Show as List, Show as Chart, OneNote, Notes, and Links. Below the toolbar is a navigation bar with tabs: Home, Actions, Manage, View, and Show Attached. The main area is a grid table with columns: Capacity Type, No., Work Shift Code, Starting Date-Time, Ending Time, Efficiency, and Capacity. The data grid contains 12 rows of calendar entries for January 2014, showing various shifts and times. An 'OK' button is at the bottom right of the grid.

Capacity Type	No.	Work Shift Code	Starting Date-Time	Ending Time	Efficiency	Capacity
Work Center	600	3	1/2/2014 12:00 AM	7:00:00 AM	100	1
Work Center	600	1	1/2/2014 7:00 AM	3:00:00 PM	100	1
Work Center	600	2	1/2/2014 3:00 PM	11:00:00 PM	100	1
Work Center	600	3	1/2/2014 11:00 PM	11:59:59 PM	100	1
Work Center	600	3	1/3/2014 12:00 AM	7:00:00 AM	100	1
Work Center	600	1	1/3/2014 7:00 AM	3:00:00 PM	100	1
Work Center	600	2	1/3/2014 3:00 PM	11:00:00 PM	100	1
Work Center	600	3	1/3/2014 11:00 PM	11:59:59 PM	100	1
Work Center	600	3	1/6/2014 12:00 AM	7:00:00 AM	100	1
Work Center	600	1	1/6/2014 7:00 AM	3:00:00 PM	100	1
Work Center	600	2	1/6/2014 3:00 PM	11:00:00 PM	100	1

FIGURE 13.5: CALENDAR ENTRIES PAGE

- o. Press **Esc** repeatedly to close all open pages.
2. Calculate a capacity calendar for machine center 450.

 - a. In the **Search** box, type "machine centers", and then select the related link.
 - b. On the **Machine Centers** list page, double-click the line for machine center 450, Finishing.
 - c. On the **Home** tab of the machine center card, click **Calendar**.
 - d. On the **Matrix Options** FastTab of the **Machine Center Calendar** page, in the **View by** field, select Month.
 - e. On the **Home** tab, click **Show Matrix**.
 - f. On the **Actions** tab of the **Machine Center Calendar Matrix** page, click **Calculate**.
 - g. On the **Options** FastTab of the **Calc. Machine Center Calendar** page, set the **Starting Date** field to January 01, 2014.
 - h. Set the **Ending Date** field to December 31, 2014.
 - i. On the **Machine Center** FastTab, in the **No.** filter field, select 450, Finishing.

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- j. Click **OK** to start the batch job. After the batch job finishes, it returns you to the **Machine Center Calendar Matrix** page.
- k. On the **Actions** tab, click **Refresh**. Notice that the capacity entries for machine center 450, Finishing, are identical to those of work center 600, Finishing Department. This is because machine centers use the shop calendar that is defined for the work center to which the machine center is assigned.

The screenshot shows a Microsoft Dynamics NAV application window titled 'View - Machine Center Calendar Matrix'. The window has a toolbar with icons for 'Calculate...', 'Recalculate...', 'Refresh', 'Clear Filter', and 'Find'. Below the toolbar is a navigation bar with tabs for 'Home', 'Actions', and 'Navigate', and the company name 'CRONUS International Ltd.' The main area displays a grid titled 'Machine Center Calendar Matrix'. The grid has columns for 'No.', 'Name', and months from 'Jan 2014' to 'Apr 2014'. The data shows capacity values for five machines: Drilling machine, CNC machine, Machine deburr, Machine inspection, and Finishing. The 'Finishing' row is selected, showing a total capacity of 31,679.63 across all four months.

No.	Name	Jan 2014	Feb 2014	Mar 2014	Apr 2014
410	Drilling machine	20,700.00	18,000.00	18,900.00	19,800.00
420	CNC machine	20,700.00	18,000.00	18,900.00	19,800.00
430	Machine deburr	20,700.00	18,000.00	18,900.00	19,800.00
440	Machine inspection	20,700.00	18,000.00	18,900.00	19,800.00
450	Finishing	31,679.63	28,799.67	30,239.65	31,679.63

FIGURE 13.6:MACHINE CENTER CALENDAR MATRIX PAGE

3. Change the capacity for machine center 450 and recalculate the capacity calendar.
 - a. Press **Esc** two times to return to the machine center card.
 - b. Expand the **Scheduling** FastTab.
 - c. In the **Capacity** field, type "2".
 - d. Repeat steps 2.c to 2.k. Notice that the capacity values for machine center 450 have doubled.
4. Change the efficiency for machine center 450 and recalculate the capacity calendar.
 - a. Press **Esc** two times to return to the machine center card.
 - b. On the **Scheduling** FastTab, in the **Efficiency** field, type "25".
 - c. Repeat steps 2.c to 2.k. Notice that the capacity values for machine center 450 are reduced to 25 percent of their most recent value, and half of their original value.
 - d. Press **Esc** three times to return to the **Machine Centers** list page.

5. Consolidate Calendars.
 - a. In the **Search** box, type “work centers”, and then select the related link.
 - b. On the **Work Centers** list page, double-click the line for work center 600.
 - c. On the work center card, expand the **Scheduling** FastTab.
 - d. Select the **Consolidated Calendar** check box.
 - e. On the **Home** tab, click **Calendar**.
 - f. On the **Matrix Options** FastTab of the **Work Center Calendar** page, in the **View by** field, select Month.
 - g. On the **Home** tab, click **Show Matrix**.
 - h. On the **Actions** tab of the **Work Center Calendar Matrix** page, click **Calculate**.
 - i. On the **Options** FastTab of the **Calculate Work Center Calendar** page, set the **Starting Date** field to January 01, 2014.
 - j. Set the **Ending Date** field to December 31, 2014.
 - k. On the **Work Center** FastTab, in the **No.** filter field, select 600, Finishing Department.
 - l. Click **OK** to start the batch job. After the batch job finishes, it returns you to the **Work Center Calendar Matrix** page.
 - m. On the **Actions** tab, click **Refresh**. Notice that the capacity entries for work center 600 change to match those of machine center 450. This is because selecting the **Consolidated Calendar** field for work center 600 means that the work center no longer has any capacity of its own. Instead, its capacity is equal to the sum of the capacities on the machine centers that are assigned to the work center. In this case, the only machine center that is assigned to work center 600 is machine center 450, Finishing.
 - n. Press **Esc** repeatedly to close all open pages.

Registered Absences

In the “Set Up a Shop Calendar” demonstration, you recorded a New Year’s holiday on January 01, 2014, for shop calendar 3, Three shifts Monday – Friday. This removed the capacity for that day from any work centers that use shop calendar 3, and from any machine centers that are assigned to those work centers.

You can also register planned absences for individual work centers or machine centers by using multiple methods.

Demonstration: Register a Planned Absence for a Work Center Manually

Scenario: After calculating capacity calendars for work center 600, Finishing Department, Eduardo, the production planner for CRONUS, registers a planned absence for the work center.

Demonstration Steps

1. Register the planned absence for work center 600, Finishing Department.
 - a. In the **Search** box, type "work centers", and then select the related link.
 - b. On the **Work Centers** list page, select the line for work center 600, Finishing Department.
 - c. On the **Home** tab of the work center card, click **Absence**.
 - d. On the **Absence** page, set the **Date** field to January 02, 2014.
 - e. In the **Starting Time** field, type "08:00:00 AM".
 - f. In the **Ending Time** field, type "4:00:00 PM".
 - g. In the **Description** field, type "Maintenance".
 - h. In the **Capacity** field, type "1". Because work center 600 only has a capacity of one, this means that you are shutting down all the work center's capacity for the specified time.

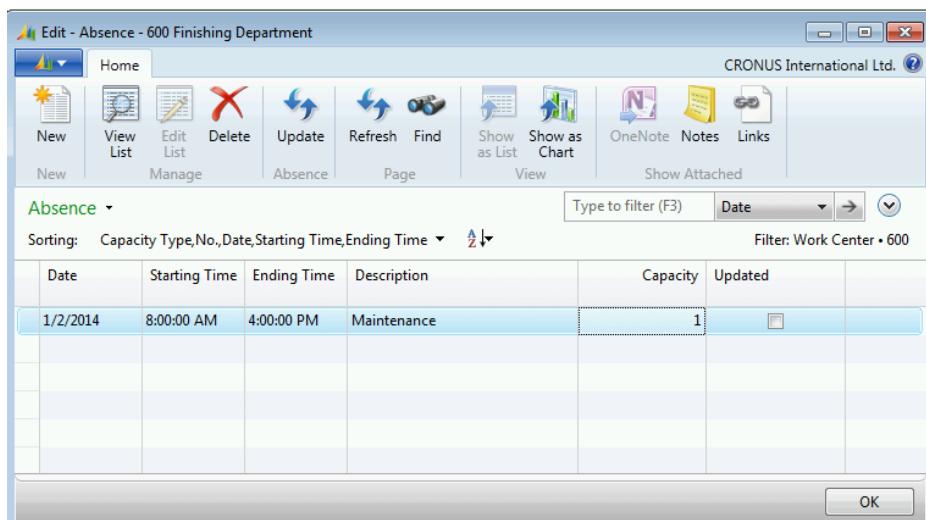


FIGURE 13.7:ABSENCE PAGE

2. Update the capacity calendar for work center 600.
 - a. On the **Home** tab, click **Update**. Notice that the **Updated** field is selected for the absence line that you created.
 - b. Click **OK** to close the **Absence** page.
 - c. On the **Home** tab of the **Work Centers** list page, click **Calendar**.

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- d. On the **Home** tab of the **Work Center Calendar** page, click **Show Matrix**.
- e. On the **Work Center Calendar Matrix** page, on the line for work center 600, drill down into the value in the Jan 2014 cell.
- f. On the **Calendar Entries** page, focus on the line for work center 600, for the shift between 8:00 AM and 4:00 PM on January 02. Notice that the value in the **Capacity (Total)** and **Capacity (Effective)** fields is zero. This is because of the planned absence that you registered in step 1.

The screenshot shows a Microsoft Dynamics application window titled 'Edit - Calendar Entries - 600 Finishing Department'. The window has a toolbar with icons for New, View List, Edit List, Delete, Show as List, Show as Chart, OneNote, Notes, and Links. Below the toolbar is a grid table with columns: Capacity Type, No., Work Shift Code, Starting Date-Time, Ending Time, Efficiency, Capacity, Capacity (Total), and Capacity (Effective). The data grid contains 14 rows of calendar entries for work center 600, primarily for January 3, 2014, with various start and end times and efficiency values. The 'Capacity (Total)' and 'Capacity (Effective)' columns show values like 240, 0, 239.9917, etc. An 'OK' button is at the bottom right of the grid.

Capacity Type	No.	Work Shift Code	Starting Date-Time	Ending Time	Efficiency	Capacity	Capacity (Total)	Capacity (Effective)
Work Center	600		1/2/2014 12:00 AM	8:00:00 AM	100	0.5	240	240
Work Center	600		1/2/2014 8:00 AM	4:00:00 PM	100	0.5	0	0
Work Center	600		1/2/2014 4:00 PM	11:59:59 PM	100	0.5	239.9917	239.9917
Work Center	600		1/3/2014 12:00 AM	7:00:00 AM	100	0.5	210	210
Work Center	600		1/3/2014 7:00 AM	3:00:00 PM	100	0.5	240	240
Work Center	600		1/3/2014 3:00 PM	11:00:00 PM	100	0.5	240	240
Work Center	600		1/3/2014 11:00 PM	11:59:59 PM	100	0.5	29.9917	29.9917
Work Center	600		1/6/2014 12:00 AM	7:00:00 AM	100	0.5	210	210
Work Center	600		1/6/2014 7:00 AM	3:00:00 PM	100	0.5	240	240
Work Center	600		1/6/2014 3:00 PM	11:00:00 PM	100	0.5	240	240
Work Center	600		1/6/2014 11:00 PM	11:59:59 PM	100	0.5	29.9917	29.9917
Work Center	600		1/7/2014 12:00 AM	7:00:00 AM	100	0.5	210	210

FIGURE 13.8:CALENDAR ENTRIES PAGE

- g. Press **Esc** repeatedly to close all open pages.

 **Note:** The same functionality that was described in this demonstration is available for machine centers.

 **Note:** There are other ways to register absences. You can use the **Register Absences** page to register absences for either work centers or machine centers. Or, you can use the **Reg. Abs. (from Work Center)** and **Reg. Abs (from Machine Center)** batch jobs to register absences for multiple work centers or machine centers at the same time. For more information about these options, refer to Help.

Capacity Journals

You use the capacity journal and the recurring capacity journal to post time directly to a work center or a machine center. This consumes the capacity of these facilities. Reasons to use these journals include assigning maintenance work and posting stop time.

A recurring capacity journal has the following additional fields:

- Recurring frequency
- Recurring method
- Expiration date

The recurring capacity journal functions exactly like all other recurring journals. This involves the following basic steps.

1. Create an entry.
2. Select a recurring frequency, such as one day or one month.
3. Select a recurring method of fixed or variable.
4. Enter an expiration date. After this expiration date, the recurring entry no longer posts.



Note: To post time to production orders, use either the output or production journal.

Demonstration: Create, Post, and Review a Capacity Journal Entry

Scenario: Work center 600, Finishing Department, goes down for emergency repairs from 08:00:00 AM to 10:00:00 AM on January 23, 2014. Eduardo, the production planner, records this downtime in the capacity journal.

Demonstration Steps

1. Create the capacity journal entry.
 - a. In the **Search** box, type “capacity journals”, and then select the related link.
 - b. On the **Capacity Journal** page, in the **Posting Date** field, select January 23, 2014.
 - c. In the **Document No.** field, type “56789”.
 - d. In the **Type** field, select Work Center.
 - e. In the **No.** field, select 600, Finishing Department.

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- f. Use the **Choose Columns** function to add the **Starting Time** and **Ending Time** fields to the page. Position them after the **Description** field.
- g. In the **Starting Time** field, type "08:00:00 AM".
- h. In the **Ending Time** field, type "10:00:00 AM".
- i. In the **Stop Time** field, type "120".
- j. In the **Cap. Unit of Measure Code** field, select MINUTES.

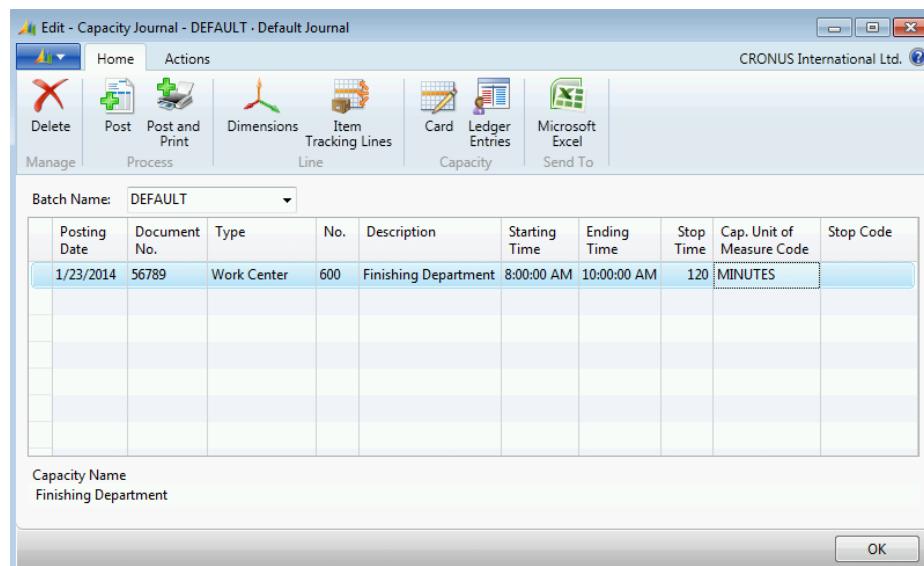


FIGURE 13.9:CAPACITY JOURNAL PAGE

2. Post the journal entry.
 - a. On the **Home** tab, click **Post**.
 - b. Click **Yes** on the request message.
 - c. Click **OK** on the confirmation message. Notice that the capacity journal entry is deleted.
 - d. Click **OK** to close the capacity journal.
3. Review the journal entry.
 - a. In the **Search** box, type "work centers", and then select the related link.
 - b. On the **Work Centers** list page, select the line for work center 600, Finishing Department.
 - c. On the **Home** tab, click **Capacity Ledger Entries**. Your entry should appear on the **Capacity Ledger Entries** page.
 - d. Click **Close** to close the page.

Lab: Set Up New Capacity

Scenario

You are the production planner at CRONUS. In response to changes on the shop floor, you must set up a new work center called "Testing Department". The new work center has one machine center, which is named "Testing". The new centers must have a capacity calendar for a single shift from 08:00:00 AM to 4:00:00 PM, Monday to Friday.

High Level Steps

1. Set up the work center.
2. Set up the machine center.
3. Calculate the machine center capacity calendar.

Detailed Steps

1. Set up the work center.
 - a. In the **Search** box, type "work centers", and then select the related link.
 - b. On the **Home** tab of the **Work Centers** list page, click **New**.
 - c. On the **General** FastTab of the work center card, in the **No.** field, type "700".
 - d. In **Name** field, type "Testing Department".
 - e. In the **Work Center Group Code** field, select 2, Production department.
 - f. Expand the **Posting** FastTab.
 - g. In the **Direct Unit Cost** field, type "3.25".
 - h. In the **Unit Cost Calculation** field, select Time.
 - i. In the **Flushing Method** field, select Manual.
 - j. In the **Gen. Prod. Posting Group** field, select NO VAT. Note that this selection depends on your accounting setup.
 - k. Expand the **Scheduling** FastTab.
 - l. In the **Unit of Measure Code** field, select MINUTES.
 - m. In the **Capacity** field, type "1".
 - n. In the **Efficiency** field, type "90".
 - o. In the **Shop Calendar Code** field, select 1, for one shift from Monday to Friday.
 - p. Click **OK** to close the work center card.

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2. Set up the machine center.
 - a. In the **Search** box, type "machine centers", and then select the related link.
 - b. On the **Home** tab of the **Machine Centers** list page, click **New**.
 - c. On the **General** FastTab, in the **No.** field, type "460".
 - d. In the **Name** field, type "Testing".
 - e. In the **Work Center No.** field, select 700, Testing Department.
 - f. Expand the **Posting** FastTab.
 - g. In the **Direct Unit Cost** field, type "3.25".
 - h. In the **Flushing Method** field, select Manual.
 - i. In the **Gen. Prod. Posting Group** field, select NO VAT. Note that this selection depends on your accounting setup.
 - j. Expand the **Scheduling** FastTab.
 - k. In the **Capacity** field, type "1".
 - l. In the **Efficiency** field, type "90".
 - m. Expand the **Routing Setup** FastTab.
 - n. In the **Setup** Time field, type "10".
3. Calculate the machine center capacity calendar.
 - a. On the **Home** tab of the machine center card, click **Calendar**.
 - b. On the **Matrix Options** FastTab of the **Machine Center Calendar** page, in the **View by** field, select Month.
 - c. On the **Home** tab, click **Show Matrix**.
 - d. On the **Actions** tab of the **Machine Center Calendar Matrix** page, click **Calculate**.
 - e. On the **Options** FastTab of the **Calc. Machine Center Calendar** page, set the **Starting Date** field to January 01, 2014.
 - f. Set the **Ending Date** field to December 31, 2014.
 - g. On the **Machine Center** FastTab, in the **No.** filter field, select 460, Testing.
 - h. Click **OK** to start the batch job. After the batch job finishes, it returns you to the **Machine Center Calendar Matrix** page.
 - i. On the **Actions** tab, click **Refresh**.
 - j. On the line for machine center 460, Testing, drill down into the value in the Jan 2014 column.
 - k. On the **Calendar Entries** page, notice that the daily capacity entries in the **Capacity (Total)** field are for 480 minutes. This reflects one eight-hour shift for each work day. Also notice that the values in the **Capacity (Effective)** field are 432 minutes. This reflects the 90 percent efficiency rate that you assigned to the machine center.
 - l. Press **Esc** repeatedly to close all open pages.

Module Review

Successful planning depends as much on accurately defining your products, processes, and capacities as it does on predicting the future. Defining facility hierarchies, calendars, and planned absences is an important part of this process.

Test Your Knowledge

Test your knowledge with the following questions.

1. To which type of facility can you assign a Shop Calendar Code?

Machine center

Work center

Work center group

All of the above

2. What happens if you block a work center or machine center?

3. What happens if you select the Consolidated Calendar field on the work center card?

4. What is the difference between a shop calendar and a capacity calendar?

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5. What does the capacity journal do?

- () It lets you change the capacity calendars for facilities.
- () It lets you schedule planned absences.
- () It detects situations where you have insufficient capacity.
- () It lets you post capacity consumption.

Test Your Knowledge Solutions

Test Your Knowledge

1. To which type of facility can you assign a Shop Calendar Code?

- () Machine center
- (✓) Work center
- () Work center group
- () All of the above

2. What happens if you block a work center or machine center?

MODEL ANSWER:

You can no longer post to it.

3. What happens if you select the Consolidated Calendar field on the work center card?

MODEL ANSWER:

If you select this field, the work center has no capacity of its own. Instead, its capacity is equal to the sum of the capacities of the machine centers that are assigned to the work center.

4. What is the difference between a shop calendar and a capacity calendar?

MODEL ANSWER:

A shop calendar establishes a base calendar that you can assign to many work centers. A capacity calendar is a refined version of the shop calendar and is specific to one work center or machine center.

5. What does the capacity journal do?

- () It lets you change the capacity calendars for facilities.
- () It lets you schedule planned absences.
- () It detects situations where you have insufficient capacity.
- (✓) It lets you post capacity consumption.