OMS

Operations and Maintenance System

User Manual

Release 1.1

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1 OMS Overview

The INTEG Operations and Maintenance System (OMS) bridges the gap between the plant floor and the enterprise. OMS provides real time data to the user to gain valuable insight as to the status and effective use of plant equipment. Easily configurable to cover one piece of equipment or a whole plant, the OMS can look at a range of signals to determine the operating efficiency. OMS can track data by work center and if desired, by operator, work order and/or part. The data is stored in database files for viewing and reporting via the OMS web-based interface. The open database structure enables the data to be utilized directly by higher level enterprise systems, such as ERP and MES.

1.1 OMS Terminology

There are several concepts for the OMS that must be understood in order to appreciate the range of utility of the product.

A “JNIOR” is INTEG’s Ethernet input/output (I/O) device that enables the real time data signals to be received by OMS. The JNIOR can handle both digital and analog signals. The user connects the appropriate signals from a work center to the JNIOR and the JNIOR acts as a data buffer as well as a seamless link to OMS running on a PC.

A "work center" represents the place where work is done. This can be a machine that makes widgets, a machine that performs a process without any widget-like output, or an area where packaging or assembly occurs. Currently the work center can be configured to take inputs that are wired to a JNIOR. These inputs can be anything from an existing machine electrical signal to something like a button that is wired into a JNIOR.

A "part" is an item that is made at a work center.

A "route" consists of one or more steps that are performed at a specified work center type. The concept of routing allows configuration of the system to link certain parts to certain types of work centers. A route is assigned to a part to show the path the part takes through the work centers. When it comes time to start working on a particular part, having routing configured in OMS allows a limited, but relevant, set of options to be presented to the operator for the work center he/she is at.

A "work order" is a number of parts that are to be made on a specified route.

A "user" is configured to allow an operator to log into a work center. The information generated at a work center is also associated to a logged-in operator.

A "shift" is a designated time span that can be configured for ease of reporting. By selecting a start time, end time, and a number of days in a given week, a report can easily be run to show the data for the configured shift.

Once the appropriate items are configured for OMS, the system is ready for use. The minimum configuration required for OMS is the installation of one JNIOR and an appropriate work center set-up. This allows real time data to be stored and graphed for a work center and provides a basic work center utilization report. With full configuration, an operator can log into a work center and start a job to produce a part. Starting a job consists of choosing the work order, part, and step that is to be worked on by the operator at the work center. Normal work center operation is then done. Once the job has been finished, the operator stops the job, entering the audit information as necessary. The audit information includes how many pieces were actually made and how many pieces of scrap were generated.

1.2 OMS Data

The purpose of OMS is to gather real time information about a work center, store the data and generate appropriate statistical information and reports on the utilization of the work center. With the appropriate signals connected for the work center, one of the goals of OMS is to be able to calculate the Overall Equipment Efficiency (OEE). OEE data can take many forms and has many definitions, the scope of which far exceeds this manual. The OMS, however, utilizes the following equations for its calculations:

OEE% = Availability X Efficiency X Quality

Availability = *Time Running* / *Time Available*

Efficiency = *Parts Made* / Parts Theoretically Possible

Quality = Parts Good / (Parts Good + Scrap)

The *italicized* words above represent data gathered from signals connected to the JNIOR and configured for the work center.

Time Running comes from the **Running** signal.

Time Available comes from the **Available** signal.

Parts Made comes from the **Stroke** signal and knowing how many strokes it takes to make a part.

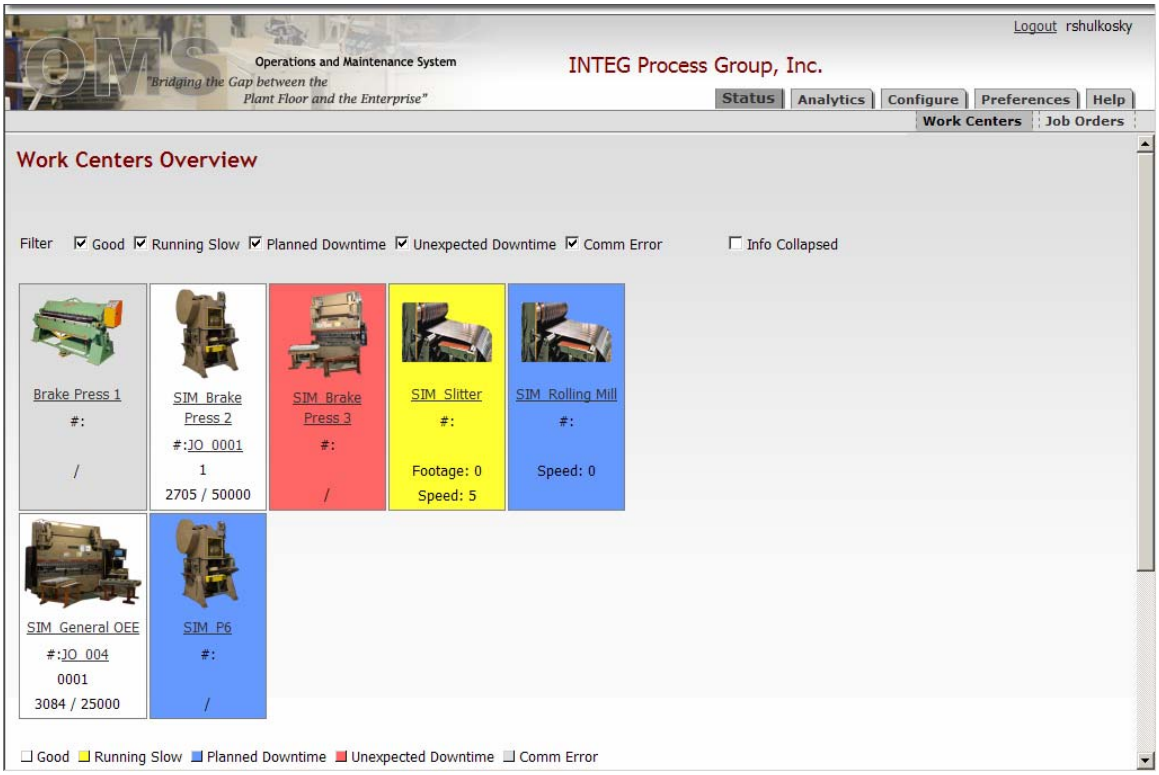
The "Parts Theoretically Possible" value is determined by knowing the theoretical rate of production for a given part, and is calculated for a given time span. The "Scrap" and "Parts Good" values are determined by operator entry at the job audit screen after stopping a job at a work center.

The OMS reporting allows the OEE value to be given on a work center, operator, part, and work order basis.

2 OMS Navigation

Navigation through OMS occurs mainly through the tabs on the top right of the web screens. Depending on the permissions of a logged in user, section tabs for Status, Analytics, Configure, Preferences, and Help are available. Under each of the section tabs, one or more page selections can be chosen from. For a given page, the section tab and page selection that the page falls under is colored when the page is up in the browser.

The following is a screen shot of the main page when logged in as an Administrator.



3 OMS Login

The OMS requires a user to login in order to do anything except see the status of the system. The functionality of starting a job, stopping a job, entering job details, and configuring the system require some level of privileges gained by logging in.

There are conceptually two login type pieces of functionality. First, there is a Log In for the web pages. Second, there is an Operator Sign In for a work center.

1. The web pages Log In is located in the upper right corner of the header of every OMS page. This log in allows the proper web pages and web page controls to appear based on privilege level.

2. The work center Operator Sign In allows statistics to be generated for the operator responsible for production at the work center while that operator is signed in.

   NOTE: Logging in so that the OMS web pages are set-up for the operator requires a username and password. However, for the Operator Sign In, the operator will have the option to select his name from a list or enter their ID number when on a Work Center page. The operator of the work center does not have to "log in" in the upper right corner. They just need to "sign in" on their respective Work Center page. Both types of users are set-up under the Configure/Users tab by an administrator.

There are effectively four levels of user privileges for the OMS Log In: **not logged in, Operators, Supervisors, and Administrators**. A user can be configured to have any combination of Operators, Supervisors, and Administrators privileges.

Without logging in, a user will be permitted to navigate to the Status→Work Centers, Status→Work Orders, and the Help→About pages. While at the Status→Work Orders page and Status→Work Centers page, specific work orders and work centers can be selected to see more detailed information. However, modifying a work order, starting a job, ending a job, and entering job details are prohibited.

The **Operators level login** permission allows a user to sign into a work center, start and stop a job, and enter job details. The user is still denied permission to modify existing configuration.

The **Supervisors level login** permission allows a user to view OMS reports. This login permission level does not allow a user to sign in as an operator on a work center or configure the OMS system.

The **Administrators level login** permission allows a user to configure the OMS system. This login permission level does not allow a user to sign in as an operator on a work center or to view OMS reports.

4 Configuration

Configuration of the OMS must be done before the OMS can be utilized. Each of the items mentioned in the OMS Terminology section can be configured in one or more ways. A little planning at this point would be beneficial for the implementation of the OMS. While not necessary, things such as consistent naming conventions makes the OMS system easier to understand and use. All aspects of the system show the names of the parts, routes, work centers, and work orders.

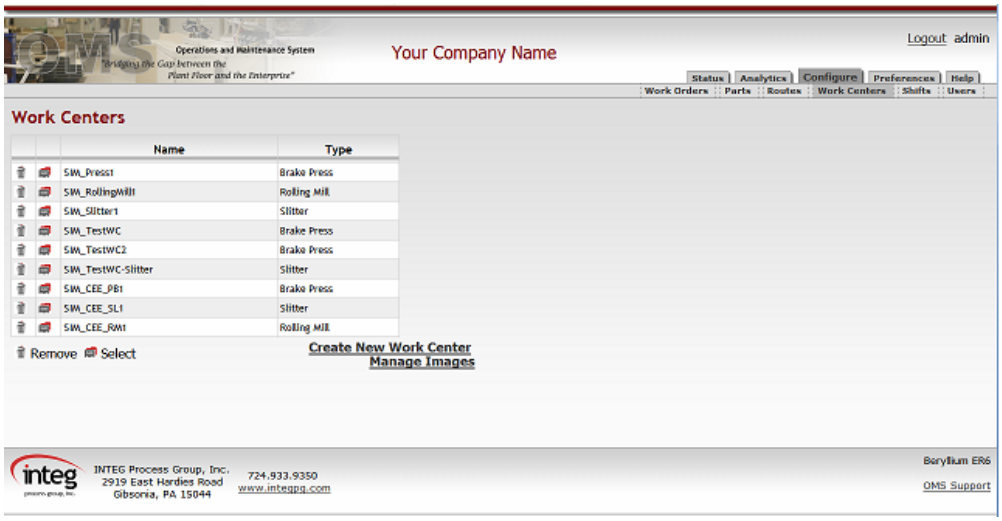
There is not a set order by which OMS needs to be configured. There are, however, some OMS areas that require other areas be configured, for example parts have routes associated with them, and routes have steps on work centers. The most straightforward

way to configure the system is to create work centers, then routes, then parts, and finally work orders. Users and shifts can be configured at any point and are not dependent on the other portions of OMS.

4.1 Work Centers

4.1.1 Configuring a New Work Center

To configure a new work center, navigate to the Configure→Work Centers page. This page lists all of the work centers currently existing in the system as shown below.



To create a new work center, click the "Create New Work Center" link at the bottom right of the page. The link will open the Work Center popup window as shown below.

In the Enter Name textbox, the name for the work center can be entered, up to 50 alphanumeric characters long. Select a work center type from the Select Type dropdown, which is populated with available work center types for the OMS. Select a work center image from the Select Image dropdown, which is populated from the images in the image gallery.

> **NOTE:** OMS includes an initial set of work center types. If a specific type of work center is required for your operations, INTEG will discuss this with you prior to order placement to define a work center type to be created for your operations. This flexibility is key to the OMS operation and scalability.

The image selected from the dropdown will join the specified image to the work center for easier referencing from the work center status overview page. If an image is not specified, a default image for the type of work center will be automatically assigned to the work center. The user can also import images of their work center.

Once a work center type is selected, the Work Center popup will expand vertically to show the signal setup. Depending on the type of work center chosen in the Select Type dropdown, the list of configurable signals for that type of work center appears for configuration.

For each signal, select a device (a JNIOR) and the associated channel. Be sure that the correct device and channel supply the desired signal type or data collected from that signal will be unrecognizable by OMS.

Selecting "OK" on the Work Center popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.1.2 Modifying an Existing Work Center

To configure an existing work center, navigate to the Configure→Work Centers page. Select a workcenter to be modified by clicking the gray/red folder icon ( ) to the left of the work center name. The Work Center popup will open with the selected work center's information. All fields on the popup are editable, including the name field.

Selecting "OK" on the Work Center popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.1.3 Removing an Existing Work Center

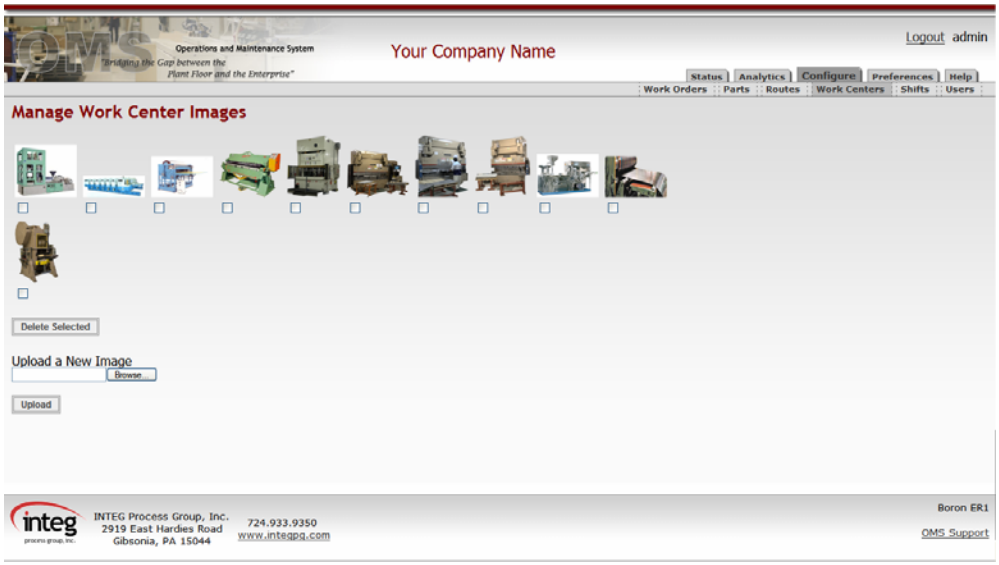
To remove a work center, navigate to the Configure→Work Centers page. Click the trashcan icon ( ) to the left of the work center name to be removed. A confirmation popup will appear asking if the work center should be removed. Clicking "OK" on the popup will remove the work center completely and close the popup. By clicking "Cancel", or clicking the close icon ("x" at the top right of popup), the work center will remain unaffected and the popup will close. After clicking "OK", the page will reload and the deleted work center is removed from the list.

4.1.4 Managing Work Center Images

To add a new image to associate with work centers, navigate to the Configure→Work Centers page. Click the "Manage Images" link at the bottom right of the page. The link will open the Manage Work Center Images page, which shows all available images with a checkbox below each. From this screen images can be added or deleted.

To add an image, click the "Browse…" button. Alternatively, type the location of the image to be uploaded directly into the Upload a New Image textbox. Once the location of the image has been set, click "Upload". The uploaded image will be added to the top of the page, showing it is now available in OMS as an image for work centers.

To delete an image, check the checkbox under each image to be deleted. Once the images to be deleted have been selected, click the "Delete Selected" button under the images and the selected image or images will be removed. If an image that has been used for a work center is deleted, the image will still remain on the Work Center→Status Page, but the image will not be available for future work centers being configured. If an image is deleted and another image with the same name is uploaded, the new image will appear on all work centers the old image was associated with.



4.1.5 Work Center Types

Several work center types exist for configuration in the system. Depending on the work center type, a variable number of signals can be configured. The more signals that are configured, the better information the system can give. Although the work center types may take the same signals, OMS will differentiate amongst them for routing purposes, starting a job, job details, end of job audit and a variety of other features.

General OEE

This is a generic work center type, available for configuration for a number of scenarios. This work center takes up to three inputs and generates OEE data based the signal state.

Signal Name	Type	Explanation
Available{Off:On}	DIN	Represents the state of the machine for when it should be in operation. For OEE data, the amount of time this signal is high compared to the amount of time the Producing signal is high impacts the OEE percent.
Producing{Stopped:Started}	DIN	Represents the state of the machine when it is making parts. For OEE data, the amount of time this signal is high compared to the amount of time the Available signal is high impacts the OEE percent. The closer the Producing time is to the Available time, the better the OEE percentage.
Piece Made	DIN	Represents the state of the machine when a piece (or part) has been created. A piece is counted when the system sees a low to high transition on the input.

Press Brake

This work center type is specifically for configuration of a machine making discrete parts such as a stamping press, press brake, etc. This work center takes up to three inputs and generates OEE data based the state of those signals in the same way as the General OEE work center.

Signal Name	Type	Explanation
Available{Off:On}	DIN	Represents the state of the machine for when it should be in operation. For OEE data, the amount of time this signal is high compared to the amount of time the Producing signal is high impacts the OEE percent.
Producing{Stopped:Started}	DIN	Represents the state of the machine when it is making parts. For OEE data, the amount of time this signal is high compared to the amount of time the Available signal is high impacts the OEE percent. The closer the Producing time is to the Available time, the better the OEE percentage.
Piece Made	DIN	Represents the state of the machine when a piece (or part) has been created. A piece is counted when the system sees a low to high transition on the input.

Slitter

This work center type is specifically for configuration of a slitter machine. This work center takes up to four inputs and generates OEE data based the state of those signals.

Signal Name	Type	Explanation
Footage	DIN	This input counts low to high transitions and calculates the number of feet gone by. This input does not affect OEE.
Available{Off:On}	DIN	Represents the state of the machine for when it should be in operation. For OEE data, the amount of time this signal is high compared to the amount of time the Producing signal is high impacts the OEE percent.
Current	AIN	This input takes a +/- 10V signal from the 10V module and represents the amount of current the slitter is drawing. For OEE data, the amount of time this signal and the Speed signal are both above a threshold value translates into a Producing signal being on for that amount of time. This translated Producing signal is compared to the amount of time the Available signal is high to determine the OEE percent. The closer the translated Producing time is to the Available time, the better the OEE percentage.
Speed	AIN	This input takes a +/- 10V signal from the 10V module and represents the speed of the slitter. For OEE data, the amount of time this signal and the Current signal are both above a threshold value translates into a Producing signal being on for that amount of time. This translated Producing signal is compared to the amount of time the Available signal is high to determine the OEE percent. The closer the translated Producing time is to the Available time, the better the OEE percentage.

Rolling Mill

This work center type is specifically for configuration for a rolling mill or similar type continuous operation. This work center takes up to three inputs and generates OEE data based the state of those signals.

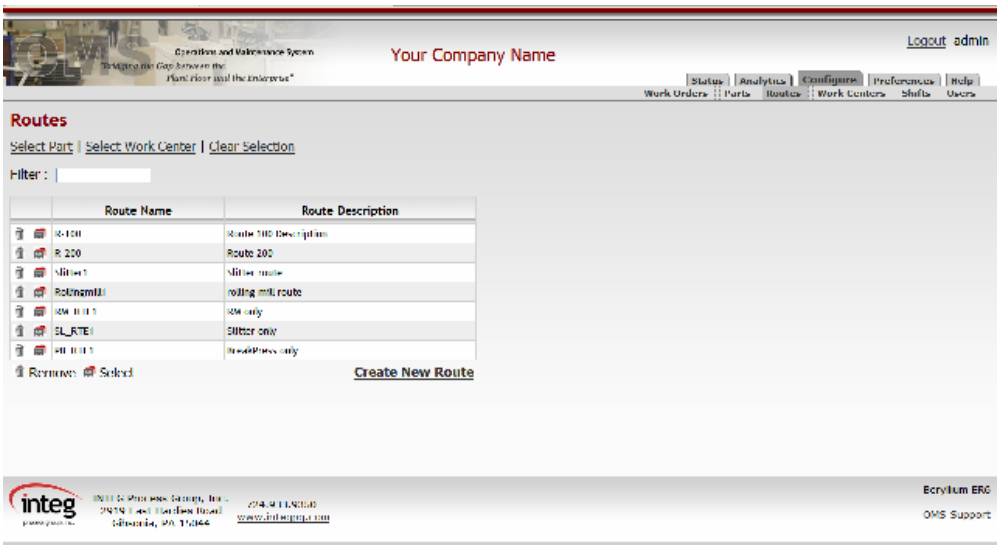
Signal Name	Type	Explanation
Available{Off:On}	DIN	Represents the state of the machine for when it should be in operation. For OEE data, the amount of time this signal is high compared to the amount of time the Producing signal is high impacts the OEE percent.
Current	AIN	This input takes a +/- 10V signal from the 10V module that represents the amount of current the rolling mill is drawing. For OEE data, the amount of time this signal and the Speed signal are both above a threshold value translates into a Producing signal being on for that amount of time. This translated Producing signal is compared to the amount of time the Available signal is high to determine the OEE percent. The closer the translated Producing time is to the Available time, the better the OEE percentage.

Speed	AIN	This input takes a +/- 10V signal from the 10V module and represents the speed of the rolling mill. For OEE data, the amount of time this signal and the Current signal are both above a threshold value translates into a Producing signal being on for that amount of time. This translated Producing signal is compared to the amount of time the Available signal is high to determine the OEE percent. The closer the translated Producing time is to the Available time, the better the OEE percentage.

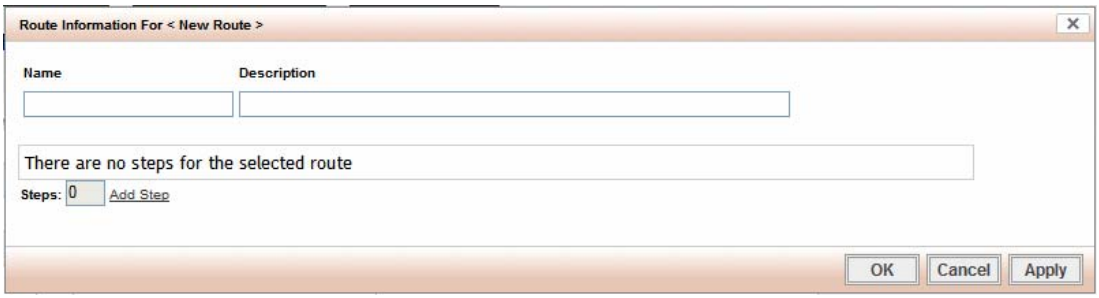
4.2 Routes

4.2.1 Configuring a New Route

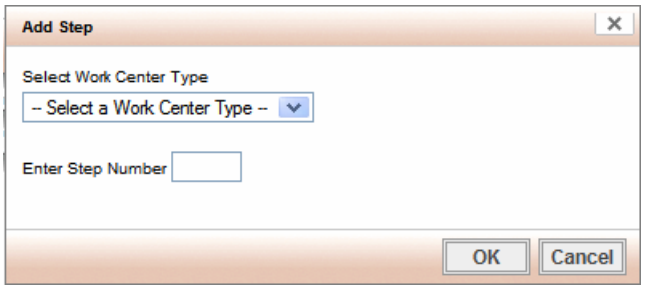
To configure a new route, navigate to the Configure→Routes page. This page lists all of the routes currently existing in the system as shown below.



To create a new route, click the "Create New Route" link at the bottom right of the page. The link will open the Route Information popup window as shown below.



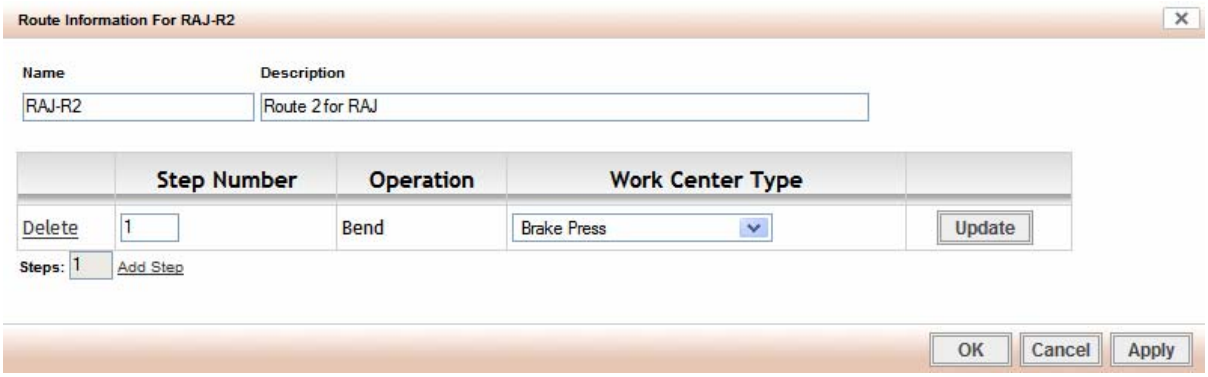
In the Name textbox, enter a name for the route, up to 50 alphanumeric characters long. In the Description textbox, enter a route description. A description for the route can be up to 1024 alphanumeric characters long. To add a step to the route, click the “Add Step” link on the bottom left of the popup. The Add Step popup will open as shown below.



A step consists of a work center type, where the step will be performed, and the step number. Select a work center type from the Select a Work Center Type dropdown, which is populated by the work center types for work centers currently configured in OMS. In the Enter Step Number textbox, the step number can be entered.

Selecting "OK" on the Add Step popup accepts the configuration and closes the popup. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards the information and closes the popup.

After a step has been added, the Route Information popup will show the new step under the Name and Description text boxes as shown below. At this point, the step may be modified by its order in the route or its work center type. The add step process may be repeated as many times as necessary to complete a route through a plant/factory, though a route must have at least one step configured for it.



Selecting "OK" on the Route Information popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

The act of adding a step to a route saves that route to the database. Creating a new route, adding a step to the new route, and then clicking "Cancel" will leave the newly create route in the database with the configured step added to it.

4.2.2 Modifying an Existing Route

To modify an existing route, navigate to the Configure→Routes page. Select a route to be modified by clicking the gray/red folder icon ( ) to the left of the desired route. The Route Information popup will open with the selected route's information.

The name and description of the route can be modified by changing the text in the provided Name and Description textboxes.

To alter the step of a route, modify the number in the textbox under Step Number. To alter the work center type, use the dropdown box under Work Center Type. After the step and/or work center type have been modified, click the “Update” button to accept the changes.

Clicking the “Delete” link to the left of a step will remove that step from the route.

Selecting "OK" on the Route Information popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup. Any changes to a step that have not been saved to the database via the "Update" button will be lost if the "OK"/"Cancel" buttons are clicked.

4.2.3 Removing an Existing Route

To remove a route, navigate to Configure→Routes page. Click the trashcan icon ( ) to the left of the route name to be removed. A confirmation popup will appear asking if the route should be removed. Clicking “OK” on the popup will remove the route completely and close the popup. By clicking “Cancel”, or clicking the close icon (“x” at the top right of popup), the route will remain unaffected and the popup will close. After clicking “OK”, the page will reload and the deleted route is removed from the list.

4.2.4 Filtering Routes

Over time, the number of routes that have been created may become large. To make searching for a route easier, the Configure→Routes page includes a filter to narrow down the number of routes listed on the page. The existing routes can be filtered by typing into the Filter textbox. The text from the textbox will filter the list of routes to only those which contain that text in either the route name or route description.

To filter in an alternate way, click the “Select Part” link at the top of the routes configuration page. This link will open a popup that contains all configured parts. By entering text into one of the text fields (Part Id, Part Name, or Description) the list of parts can be filtered down to only parts containing the entered text for the appropriate field. Select a part by clicking the Part Id link in the popup. Once a part has been selected, the popup will close. Clicking off the popup also closes it. The routes configuration page now shows only routes that are associated with the selected part. Clicking the gray/red folder icon ( ) next to a route will bring up the Route Information popup. The Route Information popup, when shown after using the Select Part filter, is shown in a way which allows the part's specific route-step information to be configured.

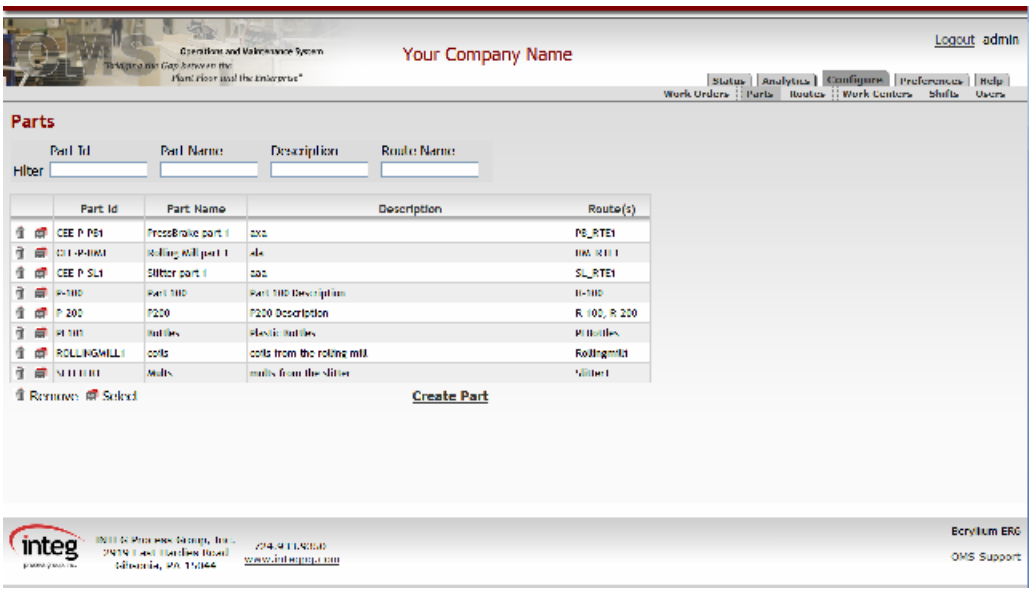
The final way to filter the routes configuration list is to click the “Select Work Center” link at top of the page. A dropdown filled with work center names appears under the link after the link is clicked. Selecting a work center from this dropdown will filter the list of routes down to only those which use the selected work center type.

After a filter has been applied to the list, clicking the “Clear Selection” link will remove the filtering and the full list of routes will be displayed.

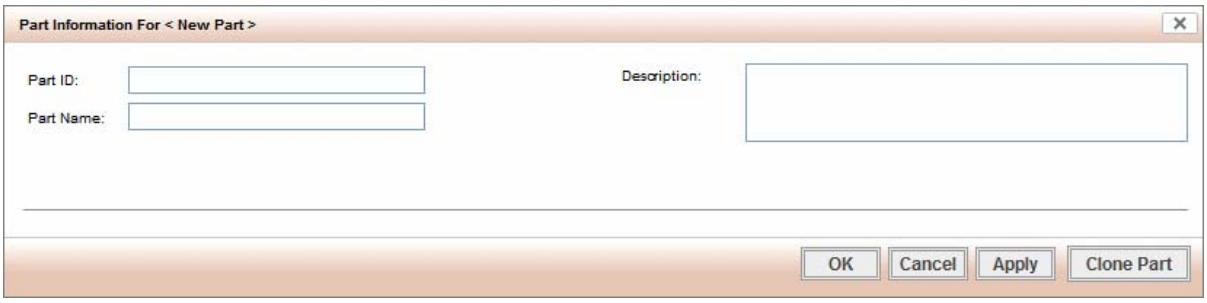
4.3 Parts

4.3.1 Configuring a New Part

To configure a new part, navigate to the Configure→Parts page. This page contains all of the existing parts currently existing in the system as shown below.



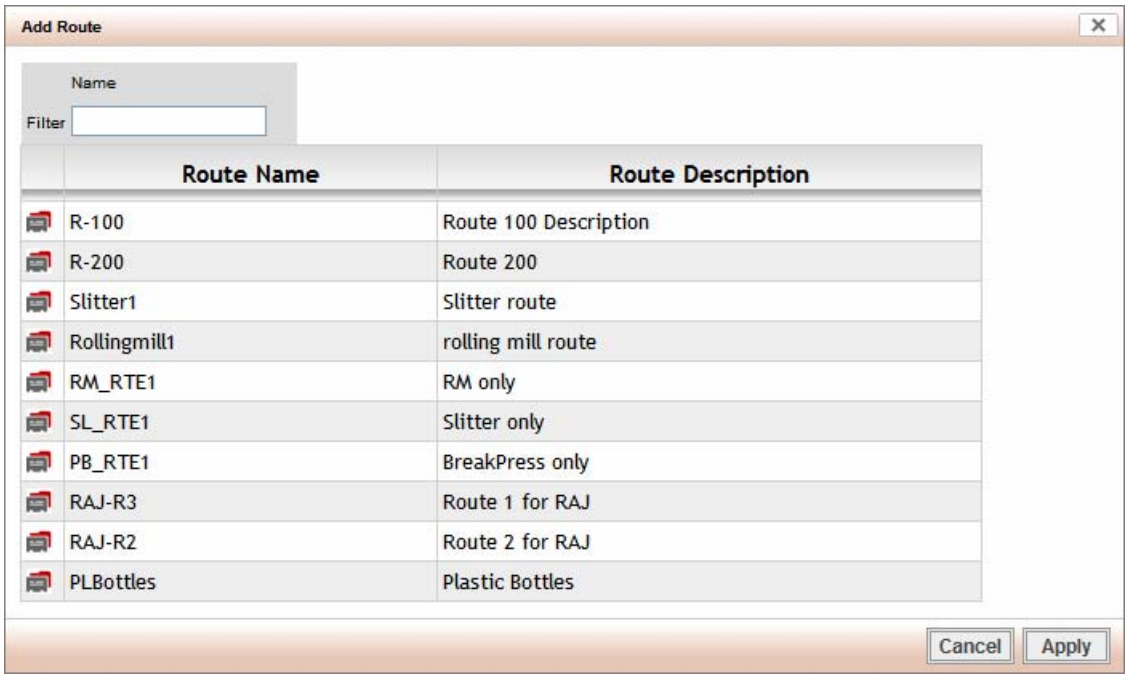
To create a new part, click the “Create Part” link on the bottom right of the page. This link will open the Part Information popup as shown below.



In the Part ID textbox, the id for the part can be entered, up to 50 alphanumeric characters long. In the Part Name textbox, the name for the part can be entered, up to 256 alphanumeric characters long. In the Description textbox, the description for the part can be entered, up to 1024 alphanumeric characters long.

The Filter textbox allows the routes to be filtered to only those routes with names that contain the text entered into the textbox.

To add a route to the part, click the “Add Route” link at the bottom of the popup to open the Add Route popup as shown below.



The Add Route popup lists all routes currently existing in the system. A filter at the top of the popup allows the routes to be filtered to only those routes which contain the text

within the filter textbox. Click the gray/red folder icon ( ) next to a route to add that route to the part. Click “Cancel” to close the Add Route popup without adding a route to the part. Once a part has been selected the pop will close and the route will be listed in the Part Information popup. By default, the first route added to a part will be set as the part's default route. If more than one route is added to the part, the default route can be changed by clicking the checkbox under the Default column for the desired route to be default.

A new route can be created from the Part Information popup by clicking the “Create New Route” link at the bottom of the popup.

Selecting "OK" on the Part Information popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup. The “Clone Part”, button will do nothing unless the “Apply” button has already been clicked, or the Part Information popup has been reached by selecting an existing part.

4.3.2 Modifying an Existing Part

To modify an existing part, navigate to the Configure→Parts page. Select a part to be modified by clicking the gray/red folder icon ( ) to the left of the desired part. The Part Information popup will open with the selected part's information.

The selected part's name and description can be modified by changing the text in the appropriate field's textbox. The Part Id cannot be changed.

Associating a route to a part is done as elsewhere described.

A route can be removed from the part by clicking the Remove Association link to the right of the route. Alternatively a route can be removed from a part by deleting the route itself. However, this method will remove the route from any part that is associated with it.

Selecting "OK" on the Part Information popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

Selecting “Clone Part” on the Part Information popup will open a small popup. The popup asks for a new Part ID. After entering a Part ID, clicking “OK” will create the cloned part in the database, close the popup, and return to the Part Information popup. Clicking “Cancel” will abort the clone, and close the popup.

4.3.3 Removing an Existing Part

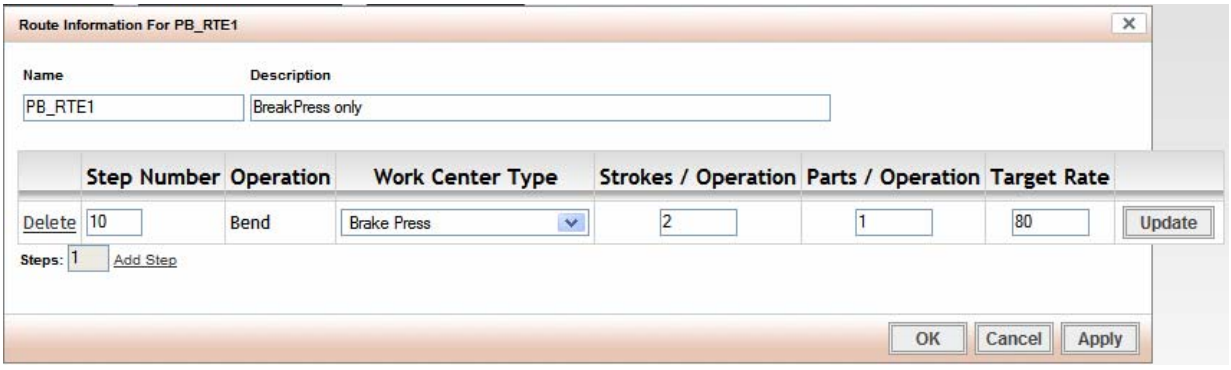
To remove a part, navigate to the Configure→Parts page. If the part has any routes associated with it, remove the routes as described elsewhere. Once the part does not have any routes associated with it, click the trashcan icon ( ) to the left of the part id. A confirmation popup will appear asking if the part should be removed. Clicking "OK" on the popup will remove the part completely and close the popup. By clicking "Cancel", or clicking the close icon ("x" at the top right of popup), the part will remain unaffected and the popup will close. After clicking "OK", the page will reload and the deleted part is removed from the list.

4.3.4 Filtering Parts

Over time, the number of parts that have been created may become large. To make searching for a part easier, the Configure→Parts page includes filters to narrow down the number of parts listed on the page. The existing parts can be filtered based on the part id, part name, description, and/or route name by typing into any of the textbox fields shown at the top of the page. The parts list will be filtered to only those parts which contain the text from the textboxes in the related fields.

4.3.5 Configuring a Part's Specific Route Step Information

Once a part has been made and associated with a route, the route can be further configured to give specific operation information for each step in the route. To configure this, navigate to the Configure→Parts page. Select the desired part by clicking the appropriate gray/red folder icon ( ), which opens the Part Information popup. Select an associated route by clicking the appropriate gray/red folder icon ( ), which opens the Route Information popup with Strokes/Operation, Parts/Operation, and Target Rate textboxes available for each step in the selected route as shown below. Alternatively, this popup can be reached by navigating to the Configure→Routes page, filtering by part by clicking the "Select Part" link and choosing the desired part, and then selecting a route from the filtered list by clicking the gray/red folder icon ( ).



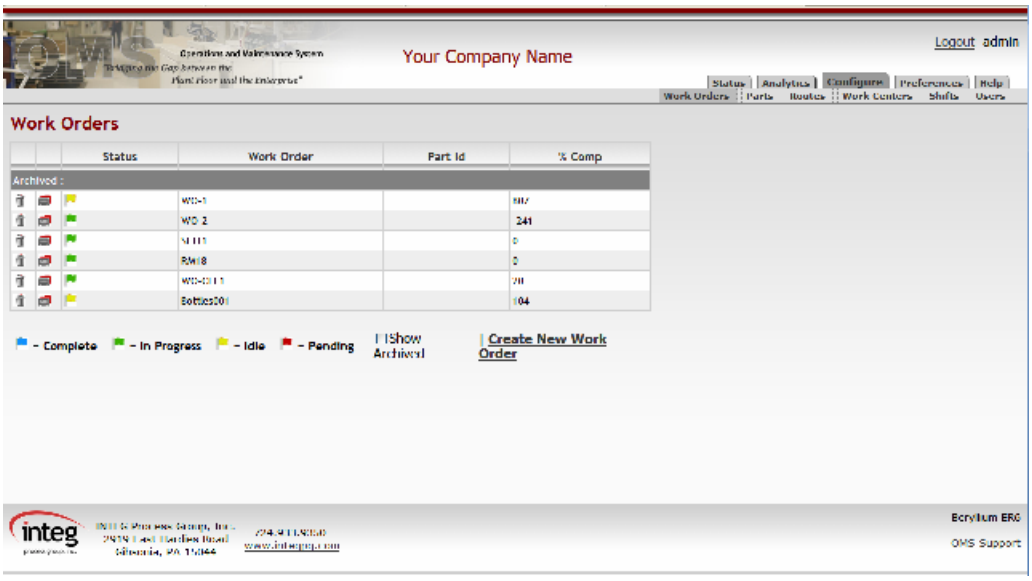
The step number and work center type can be modified for the selected route, and changing the step number or work center type will change the route information for any part with the associated route. The strokes/operation, parts/operation, and target rate for each step of the route can be modified for each part-route combination, and this information is unique per part-route combination. After modifying any of the fields for a step, click the “Update” button to save the changes to the database. This must be done as each step is modified as updating one step will cause all other step data to revert to what is in the database.

Selecting "OK" on the Route Information popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup. Any changes to a step that have not been saved to the database via the "Update" button will be lost if the "OK"/"Cancel" buttons are clicked.

4.4 Work Orders

4.4.1 Configuring a New Work Order

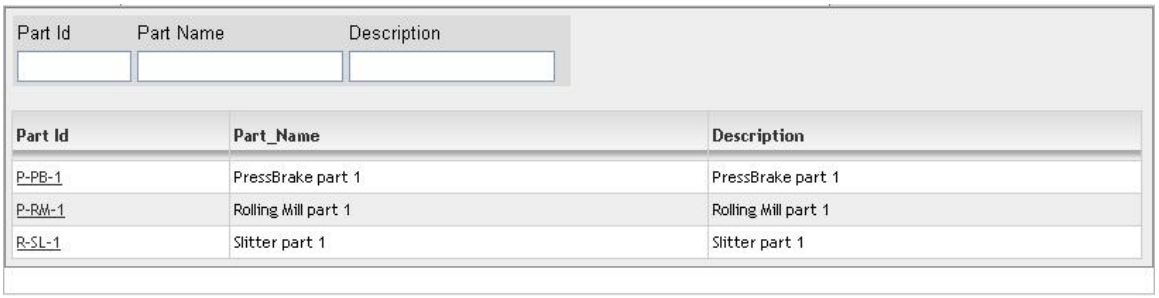
To configure a new work order, first navigate to the Configure→Work Orders page. This page lists all of the work orders currently existing in the system as shown below.



To create a new work order, click the “Create New Work Order” link at the bottom right of the page. This will open the Create New Work Order popup as shown below.

In the Work Order Number textbox, a work order number can be entered, up to 50 alphanumeric characters long. To add a part to the work order, click the “Add Part” button and the Add Part popup will appear as shown below.

In the Part ID textbox, a part id to be added to the work order can be entered. Alternatively, click the “Search” button to view the part search popup as shown below. Select a route from the Route dropdown, which is populated with all of the routes associated with the given part id. In the Quantity textbox, enter the quantity in the provided Quantity textbox, and select the units from the dropdown.



The part search popup lists all parts in the system. The filters at the top can be used to narrow the list of parts to only those containing text for the field which was entered. To add a part to the work order, click on the part id link in the popup. Selecting a part closes the popup, and populates the Add Part popup with the selected part id and the part's default route. Clicking off of the part search popup also closes it, and no part information will be populated in the Add Part popup.

Selecting "OK" on the Add Part popup accepts the configuration and closes the popup. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards the

information in the Add Part popup and closes it. After clicking “OK”, the work order configuration page will reload and the configured part is added to the list.

After a part has been added, the Create New Work Order popup will expand and list the configured part on the work order. Clicking the expander icon (⊞) next to a part shows detailed information about the part and its route.

Selecting "OK" on the Create New Work Order popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.4.2 Modifying an Existing Work Order

To configure an existing part, navigate to the Configure→Work Orders page. Select a work order by clicking the gray/red folder icon ( ) to the left of the work order name. The Work Order Information popup will open with the selected work order's information.

Parts can be added to or removed from a work order from the Work Order Information popup. Adding parts to a work order has been described elsewhere. To remove a part from the work order, click the trashcan icon ( ) to the left of a part listed on the popup. The delete confirmation popup will open, which asks for confirmation of the deletion. Clicking “Cancel” or the close icon (“x” at the top right of popup) on the delete confirmation popup will close the popup and leave the part on the work order. Clicking “OK” on the delete confirmation popup will accept the removal, and the Work Order Information popup will refresh with the part removed from the list of parts on the work order. The actual deletion of the part from the work order will not be completed until the "OK" or "Apply" buttons have been clicked on the Work Order Information popup.

Selecting "OK" on the Work Order Information popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

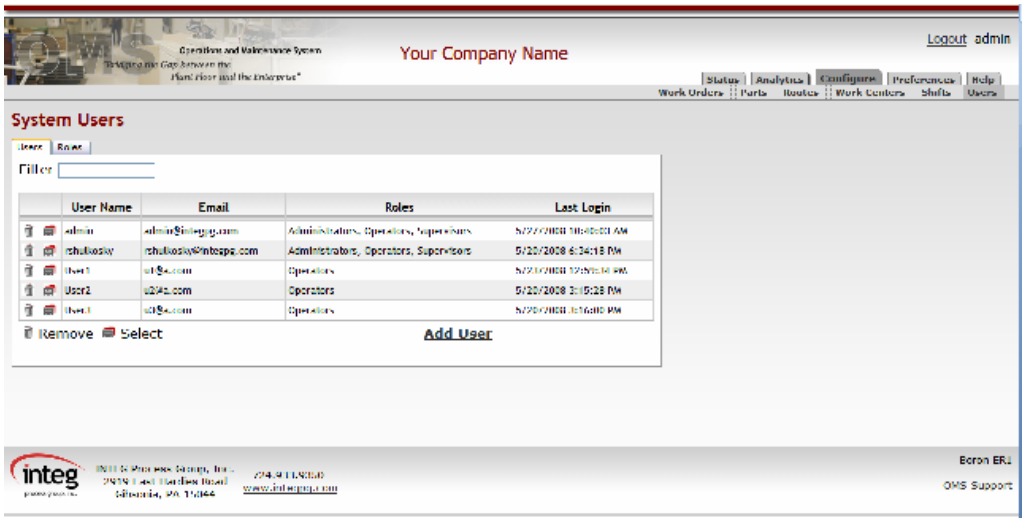
4.4.3 Removing an Existing Work Order

To remove a work order, navigate to the Configure→Work Orders page. Click the trashcan icon ( ) to the left of the work order to be deleted. A confirmation popup will appear asking if the work order should be removed. Clicking “OK” on the popup will remove the work order completely and close the popup. By clicking “Cancel”, or clicking the close icon (“x” at the top right of popup), the work order will remain unaffected and the popup will close. After clicking “OK”, the page will reload and the deleted work order is removed from the list.

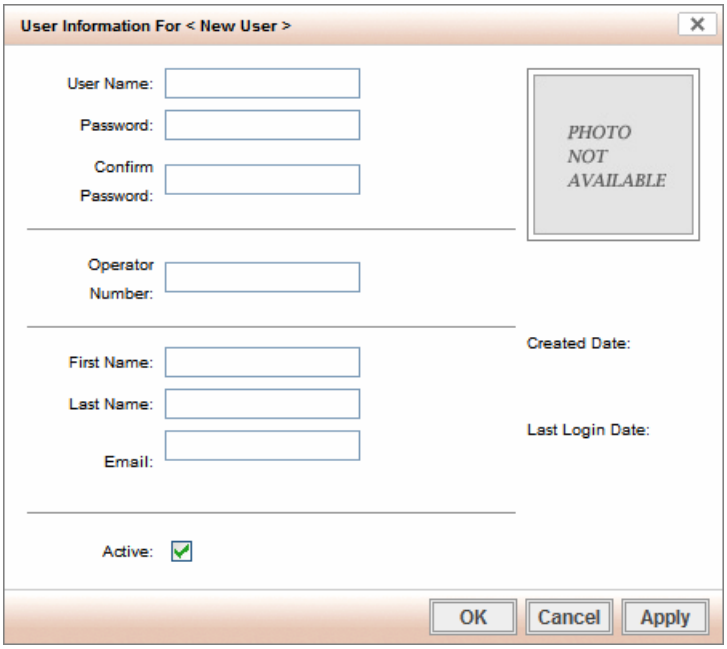
4.5 Users

4.5.1 Configuring a New User

To configure a new user, navigate to the Configure→Users page. The Users tab of this page lists the users currently existing in the system as shown below.



To create a new user, click the "Add User" link on the bottom of the Users tab. This link will open the User Information popup as shown below.



In the User Name textbox, a user's user name can be entered, up to 256 alphanumeric characters long. In the Password and Confirm Password textboxes, the same password

must be entered in each, and must be minimally 5 alphanumeric characters long. The Operator Number, First Name, Last Name, and Email textboxes allow up to 50 alphanumeric characters. The Active checkbox is set by default, which allows a user to login.

Selecting "OK" on the User Information popup accepts the configuration and closes the popup. Selecting "Apply" on the User Information popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.5.2 Modifying an Existing User

To configure an existing user, navigate to the Configure→Users page. Select a user to configure by clicking the gray/red folder icon ( ) to the left of the user name. The User Information popup open will open with the selected user's information

All fields, except the user name, on the popup are editable.

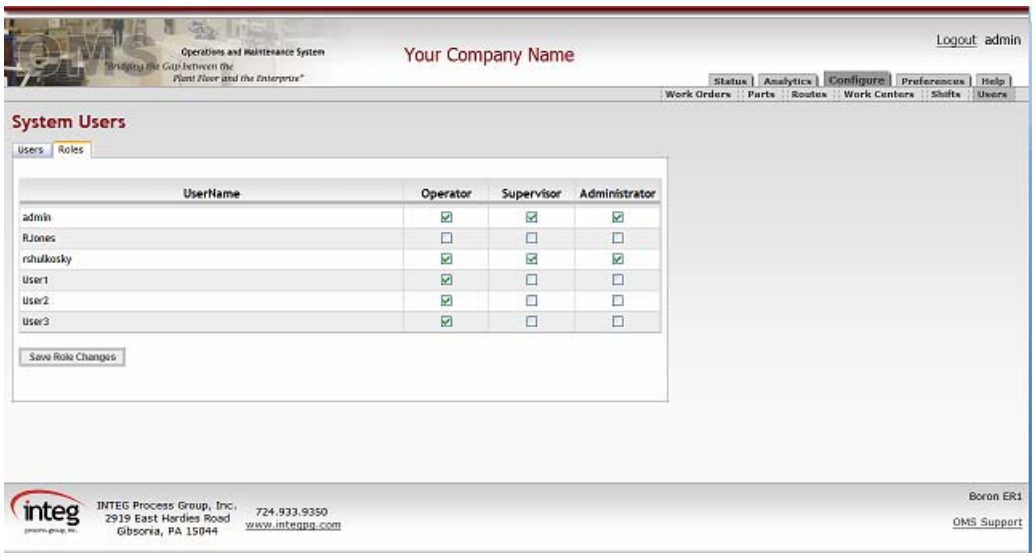
Selecting "OK" on the User Information popup accepts the configuration and closes the popup. Selecting "Apply" on the User Information popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.5.3 Removing an Existing User

To remove a user, navigate to the Configure→Users page. Click the trashcan icon ( ) next to the user name to be removed. A confirmation popup will appear asking if the user should be removed. Clicking “OK” on the popup will delete the user and the popup will close. Clicking “Cancel” or the close icon (“x” at the top right of popup) will leave the user unaffected and close the popup. After clicking “OK”, the page will reload and the deleted user is removed from the list.

4.5.4 User Roles

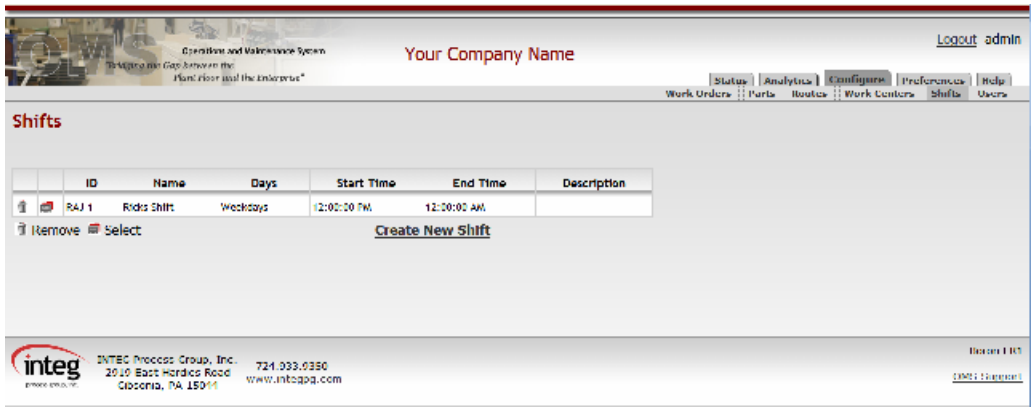
A user has roles that can be assigned to him/her. To assign roles, navigate to the Configure→Users page and click the “Roles” tab at the top of the page as shown below. A user is assigned roles by checking the checkboxes in each column for the desired role for the appropriate user. Once the appropriate roles have been checked for one or more users click the “Save Role Changes” button to apply the changes to the database.



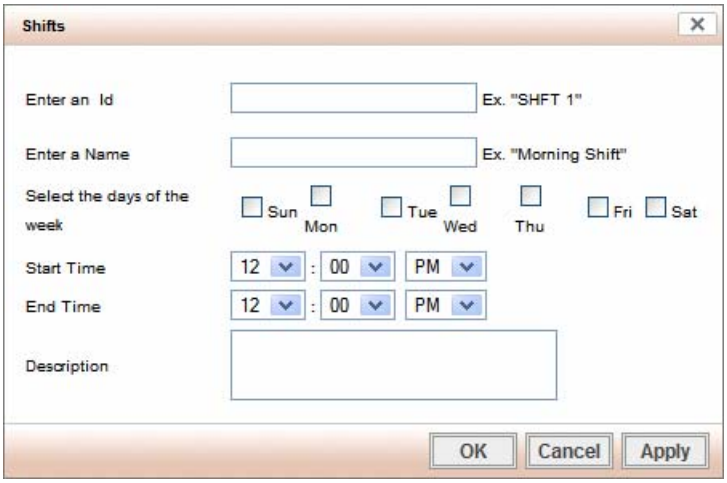
4.6 Shifts

4.6.1 Configuring a New Shift

To configure a new shift, navigate to the Configure→Shifts page. This page lists all of the shifts currently existing in the system as shown below.



To create a new shift, click the “Create New Shift” link, opening the Shifts popup as shown below.



In the Enter an Id textbox, the shift id can be entered, up to 50 alphanumeric characters long. In the Enter a Name textbox, the shift name can be entered, up 50 alphanumeric characters long. Checkboxes can be checked for all of the days on which the shift will be used. The start time and end time of the shift can be configured from the Start Time and End Time dropdowns, allowing configuration for hours, minutes, and AM/PM. In the Description textbox, a description for the shift can be entered, up to 1024 alphanumeric characters long.

Selecting "OK" on the Shifts popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.6.2 Modifying an Existing Shift

To configure an existing shift, navigate to the Configure→Shifts page. Select a shift to be modified by clicking the gray/red folder icon ( ) to the left of the shift id. The Shifts popup will open with the selected shift's information.

Any of the fields can be modified. Leaving the shift id causes the selected shift to be modified. Changing the shift id to a non-existent shift id, however, results in a new shift being added to OMS. Changing the shift id to an already existing shift id results in the existing shift being overwritten.

Selecting "OK" on the Shifts popup accepts the configuration and closes the popup. Selecting "Apply" on the popup applies the settings to the database, but the popup will remain open. Selecting "Cancel", or clicking the close icon ("x" at the top right of popup), discards any changes not saved to the database and closes the popup.

4.6.3 Removing an Existing Shift

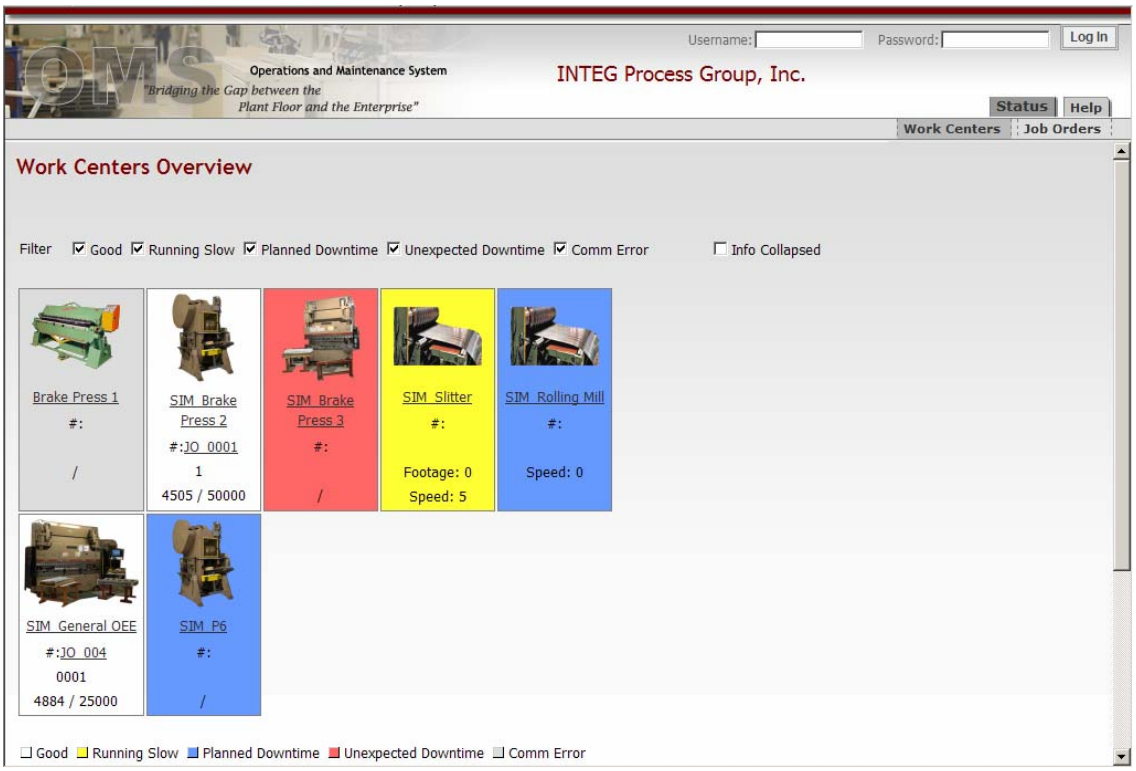
To remove a shift, navigate to the Configure→Shifts page. Click the trashcan icon ( ) to the left of the shift id to be deleted. A confirmation popup will appear asking if the shift should be removed. Clicking "OK" on the popup will remove the shift completely and close the popup. By clicking "Cancel", or clicking the close icon ("x" at the top right of popup), the shift will remain unaffected and the popup will close. After clicking "OK", the page will reload and the deleted shift is removed from the list.

5 Status

The status of the system is shown in two ways. The work center status is the main way that the system status is displayed, showing an overview of the configured work centers. The second is work order status, which shows the configured work orders.

5.1 Work Centers Overview

To view the status of all work centers, navigate to the Status→Work Centers page. The work centers overview screen shows the work centers currently configured in the system.



At the top of the Work Centers Overview page are checkboxes that allow the work centers to be filtered. By checking or un-checking the various checkboxes, the list of work centers is narrowed to only those which meet the checked status conditions.

Each work center is shown in a box with a graphic and a colored background reflecting the current status of the work center. The work center name is shown as a link, and clicking the link will bring up the work center details page, as discussed elsewhere. The current work order for the work center is also listed as a link, and clicking the link will navigate to the work order details page as discussed elsewhere. The current operator/user logged in at that work center is also listed. Additional information shown in the box for each work center varies by the work center type. The different types of information available per work center type are listed elsewhere.

The bottom of the page shows the legend for the status conditions of the work centers background coloring based on operational conditions.

- Good - This reflects that a work center is being utilized and is producing at least 80% of the specified target rate.
- Running Slow - This reflects that a work center is being utilized but is producing at less than 80% of the specified target rate.
- Planned Downtime - This reflects that a work center is not available and not running.
- Unexpected Downtime - This reflects that a work center is available for production, but not producing at all.
- Comm Error - This reflects that the JNIOR associated with the work center has not communicated with the OMS recently.

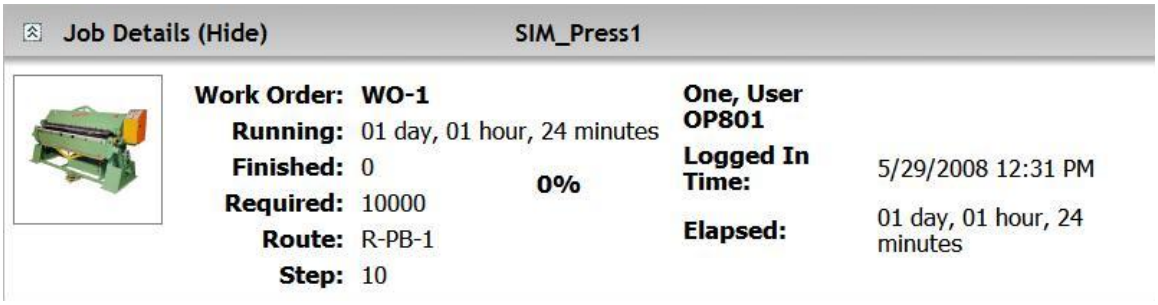
5.2 Work Center Details

To view the detailed status of a work center, navigate to the Status→Work Centers page and select the work center name link for the work center desired.

At the detailed status page, three main viewing panes, the Job Details, Current Statistics, and Machine History, are shown. The status page also allows an operator to start or end a job at the displayed work center. A list of all work centers shows their current status, and clicking on the work center name link will navigate to the work center details page for that particular work center.

5.2.1 Job Details

The Job Details viewing pane, as shown below, displays the information for the work order being run and the operator currently logged into the work center.



Clicking on Job Details viewing pane's title bar minimizes the viewing pane, and clicking a second time will restore it to its normal size. The Job Details viewing pane's title bar shows, at all times, the name of the work center currently being viewed. The information shown in the Job Details viewing pane is identical for every work center.

When the Job Details viewing pane is maximized, the left hand column shows the following information (top to bottom):

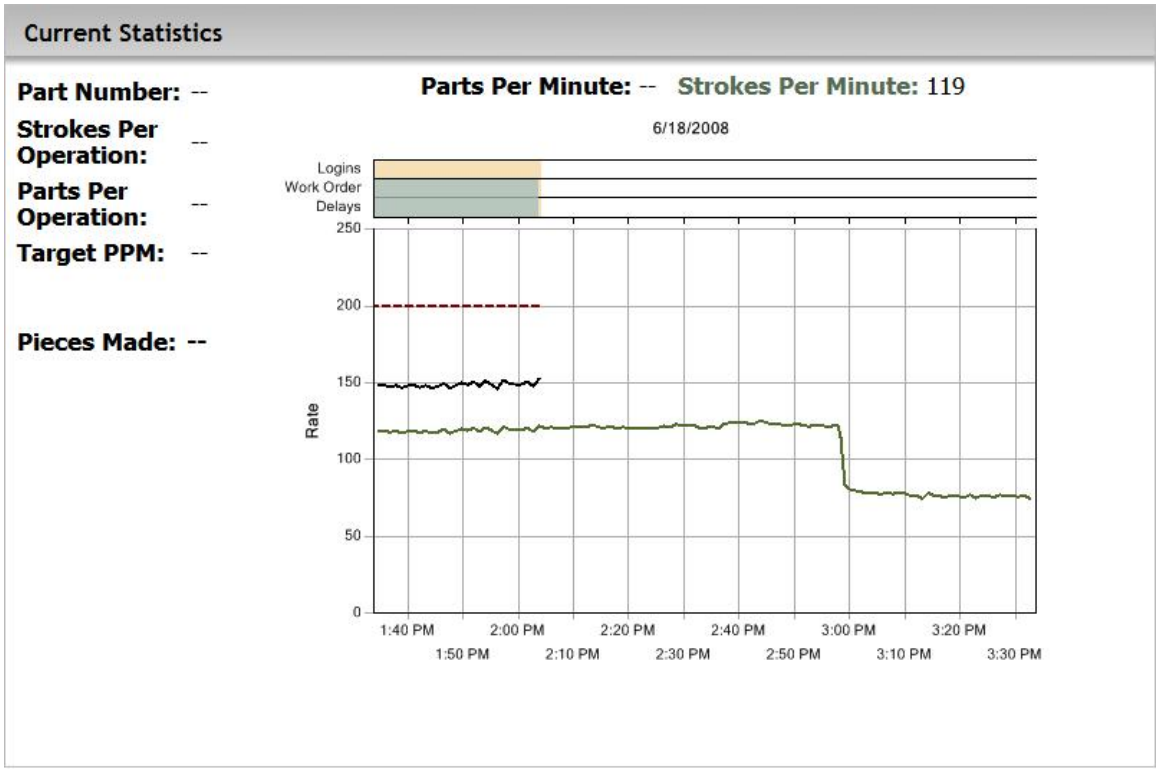
- Work Order - the work order currently running on the work center
- Running - total time since work order has been running on the work center
- Finished - number of parts made for this work order's part's step
- Finished % - the percent of the current step that is finished
- Required - number of parts necessary to complete the work order
- Route - the route that the current work order's part is on
- Step - the step that the current work order's part is on

From top to bottom, the right hand column in the Job Details pane shows:

- Operator - last name, first name, and operator number of the currently logged in operator
- Logged In Time - the timestamp of when the current operator logged in
- Elapsed - the time that has elapsed since the operator has logged in

5.2.2 Current Statistics

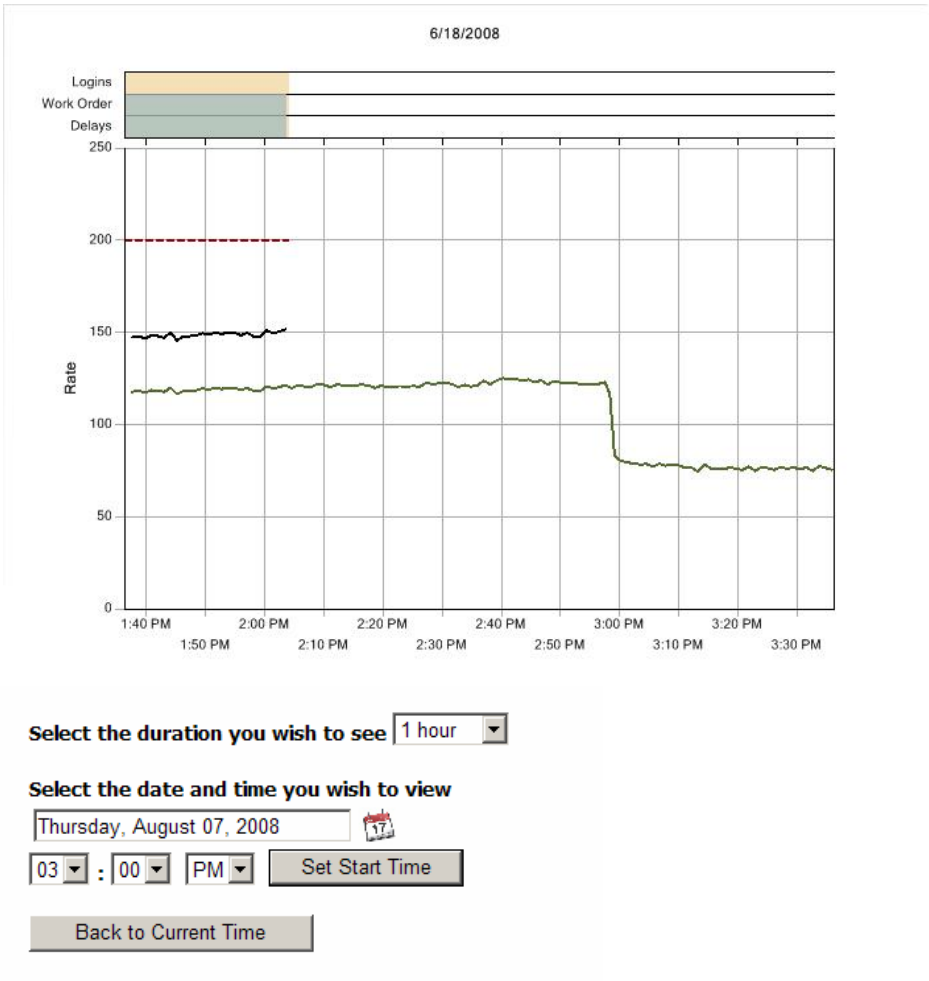
The Current Statistics viewing pane, as shown below, displays I/O data as well as other information that is work center specific for the displayed work center.



The Current Statistics viewing pane's information shown differs entirely based on work center, the details of which are discussed elsewhere. Unlike the Job Details viewing pane, the Current Statistics viewing pane cannot be minimized.

A graph of incoming data, specifics of which are dependent on the work center being viewed, is also shown on the Current Statistics viewing pane. The graph displays the last two hours of data for the signal shown. The red line on the graph illustrates the target rate (associated with the part) for the relevant data. The area above the graph details what operator, which work order, and what part has been worked on during the time shown. If the top area is white or a color missing, then a part or operator were not entered.

The graph can be double-clicked to navigate to a screen that allows the time shown on the X axis to be modified as shown below.



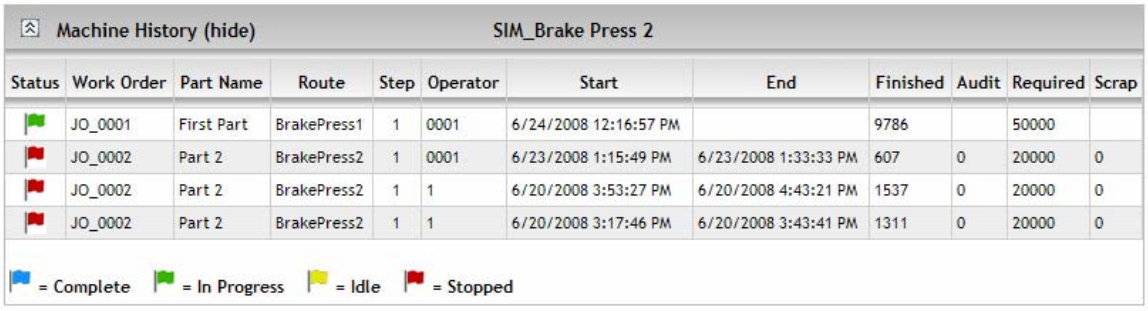
When the larger graph loads, the default time period is the previous 2 hours. The user can use the drop down to change the duration. The options are 1 hour, 2 hours, 4 hours, 8 hours, 12 hours, 16 hours, or 1 day.

The user can also select a specific day and time to "start" the data graphing for the "duration" selected. This allows the user to go back in time and view any window of data. Use the Calendar button to set the date and the pull downs to set the time and then click the "Set Start Time".

If the user left-clicks in the graph window and holds down the mouse button and drags the cursor, a "zoom" area is created. Clicking on the box with the "up arrow" in the lower left corner of the graph (the zero point of the x and y axes) returns the graph to the previous time period scale.

5.2.3 Machine History

The Machine History viewing pane, as shown below, displays the history of work orders being worked on for the displayed work center.


Machine History (hide) SIM_Brake Press 2

Status	Work Order	Part Name	Route	Step	Operator	Start	End	Finished	Audit	Required	Scrap
	JO_0001	First Part	BrakePress1	1	0001	6/24/2008 12:16:57 PM		9786		50000	
	JO_0002	Part 2	BrakePress2	1	0001	6/23/2008 1:15:49 PM	6/23/2008 1:33:33 PM	607	0	20000	0
	JO_0002	Part 2	BrakePress2	1	1	6/20/2008 3:53:27 PM	6/20/2008 4:43:21 PM	1537	0	20000	0
	JO_0002	Part 2	BrakePress2	1	1	6/20/2008 3:17:46 PM	6/20/2008 3:43:41 PM	1311	0	20000	0

= Complete = In Progress = Idle = Stopped

Clicking on Machine History viewing pane's title bar minimizes the viewing pane, and clicking a second time will restore it to its normal size.

The information shown in the Job Details viewing pane is identical for every work center.

- Status – Flag that graphically indicates the status of the entry shown
- Work Order – The work order number of the entry shown
- Part Name – The name of the part that was worked on for the entry shown
- Route – The route name of the route that was worked on for the entry shown
- Step – The step number in the route that was worked on for the entry shown
- Operator – The operator number of the operator that worked on the entry shown
- Start – The timestamp when the particular job started for the entry shown
- End – The timestamp when the particular job ended for the entry shown
- Finished – The number of parts the OMS has calculated to have been completed for the entry shown
- Audit – The good amount in the audit popup for the entry shown
- Required – The amount needed for the part listed on the work order for the entry shown
- Scrap – The scrap amount entered in the audit popup for the entry shown

The bottom of the Machine History viewing pane shows the legend for the status conditions of the work order status flags.

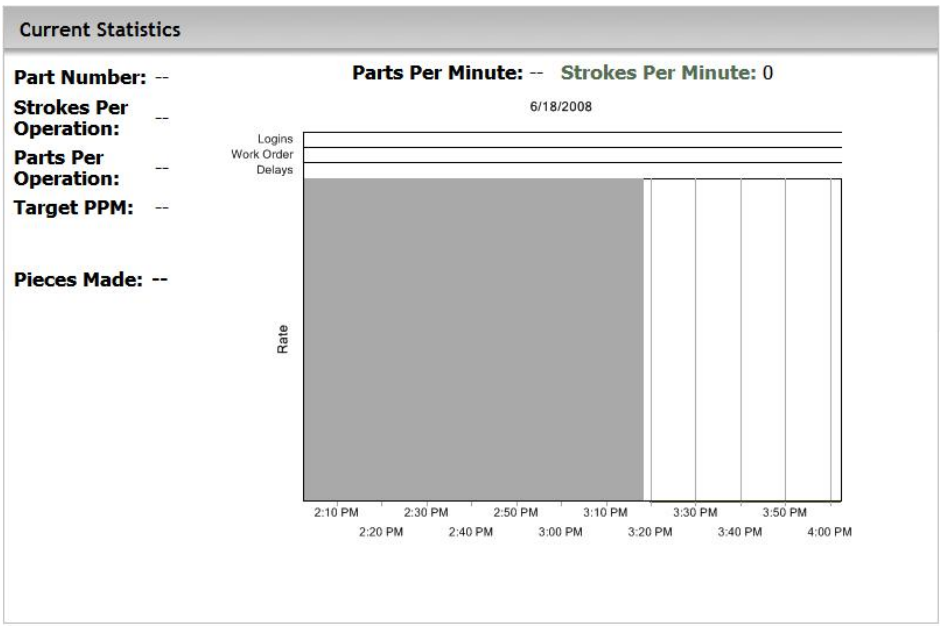
- = **Complete** - This status reflects that a work order has been completed.
- = **In Progress** - This status reflects that a work order is currently being worked on.
- = **Idle** - This status reflects that a work order has not been worked on at all.
- = **Stopped** - This status reflects that a work order has previously been worked on but is currently not being worked on.

5.3 Work Center Specifics

Some of the above mentioned details differ based on specific work center. These differences are discussed below.

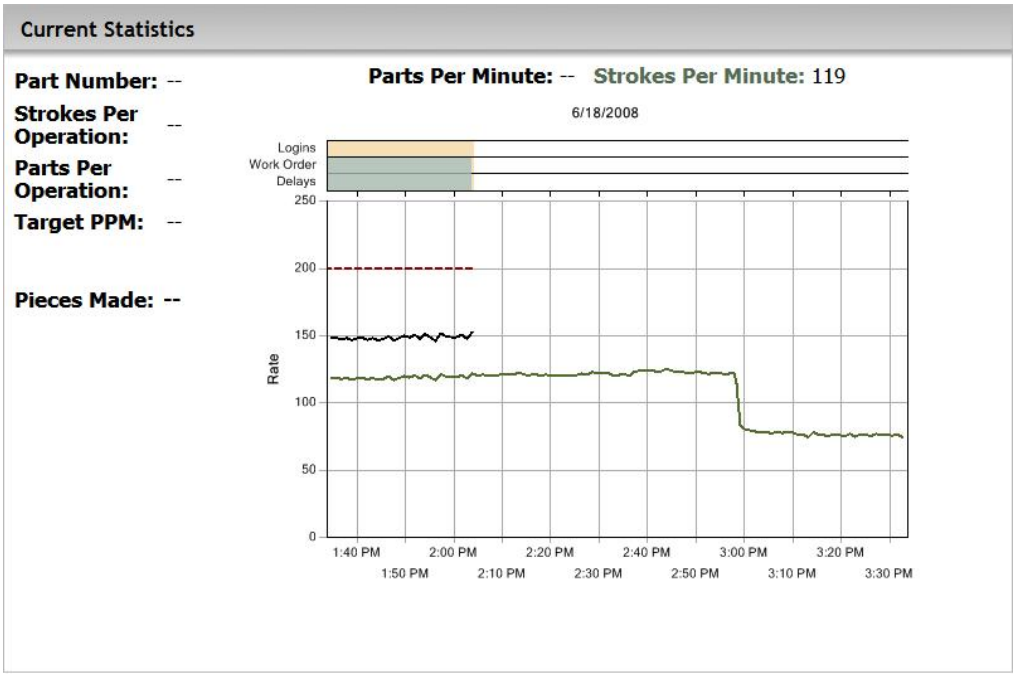
General OEE

The general OEE work center's current statistic viewing pane displays the work center's parts per minute and strokes per minute on the graph as shown below. The data on the left of the viewing pane details the part number being worked on, the strokes per operation for the current route step, the parts per operation for the current route step, the target rate for the current route step, and the total pieces made since the job started on the shown work center. The current parts per minute and strokes per minute are shown at the top of the graph.



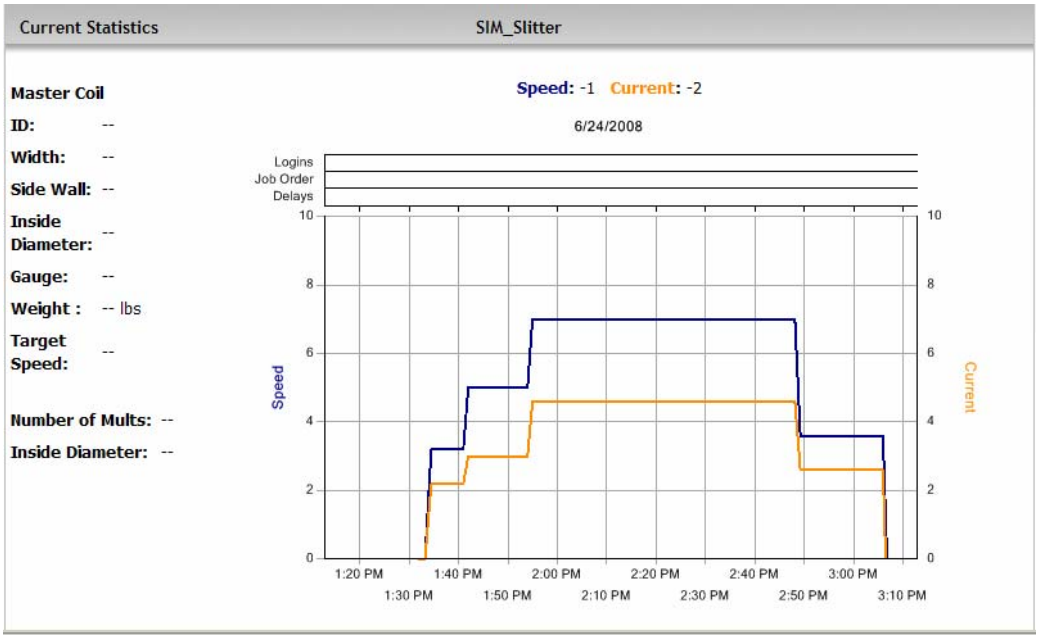
Press Brake

The press brake work center's current statistic viewing pane displays the press brake's parts per minute and strokes per minute on the graph as shown below. The data on the left of the viewing pane details the part number being worked on, the strokes per operation for the current route step, the parts per operation for the current route step, the target rate for the current route step, and the total pieces made since the job started on the shown work center. The current parts per minute and strokes per minute are shown at the top of the graph.



Slitter

The slitter work center's current statistic viewing pane displays the slitter's current and speed on the graph as shown below. The data on the left of the viewing pane details the master coil id, width, side wall, inside diameter, gauge, and weight. The number of mults, mult inside diameter, mult coil id, mult width, mult sidewall, and mult weight are also detailed on the left of the graph. The speed and current are shown at the top of the graph.



Rolling Mill

The rolling mill work center's current statistic viewing pane displays the rolling mill's current and speed on the graph as shown below. The data on the left of the viewing pane details the master coil id, width, side wall, inside diameter, gauge, and weight. The actual speed and current are shown at the top of the graph.

5.4 Work Order Details

Depending on the work center type, starting a job may involve several steps. To start a job on any work center, click the "Operator Sign In" button between the Job Details and Current Statistics viewing panes. The Operator Sign In pop up will open. Enter either an operator name (Last, First) or an operator number. After beginning to enter an existing name or number, an operator selection grid will expand on the right side of the pop up. Optionally, the operator can be selected from the grid by clicking "Select". Click "OK" to login as this operator and close the pop up. Clicking "Cancel" or the close window icon on the top right of the pop up, will abort the login and close the pop up.

Once an operator logs in, the "Start Job" button becomes visible. To start a job on any work center type, click the "Start Job" button. The Start Job pop up opens with the work center and operator fields populated and disabled. Select the desired work order from the dropdown. Once a work order is selected, the pop up will expand to allow the operator to select the desired part to be worked on, as well as the desired step. If only one part and one step exist for the selected work order on the current work center, the pop up will alert the operator. Click "OK" to start the job and close the pop up. Clicking "Cancel", or the

close window icon on the top right of the pop up, will discard the information and close the pop up.

Depending on work center type, the operator may wish to enter more detailed information about the job to allow for more detailed tracking of production once it has started. To enter this information, click the “Job Details” button between the Job Details and Current Statistics panes, if it is visible. The Enter Job Details pop up will open.

General OEE

There is no further information for this work center. The "Job Details" button is not visible.

Press Brake

There is no further information for this work center. The "Job Details" button is not visible.

Slitter

The slitter's Enter Job Detail pop up contains the following fields:

- Master Coil ID
- Width
- I.D.
- Sidewall
- Gauge
- Weight
- Destination Drum I.D.
- and number of Mults.

Enter a Master Coil ID, up to 50 alphanumeric characters, the width of the Master Coil in inches, I.D. (inside diameter) of the Master Coil in inches, Sidewall height of the Master Coil in inches, and Gauge of the Master Coil. The Weight is automatically filled once the previous fields have been entered. Now enter the Destination Drum I.D. and select how many Mults will be produced from the dropdown. After the number of Mults have been selected the pop up will expand to allow the Operator to enter the specifics for each Mult. Enter the Width, and Sidewall into the appropriate textboxes and the Weight will automatically be calculated. Click “OK” to accept the details and close the pop up. Clicking “Cancel” or the close window icon on the top right of the pop up, will discard the details and close the pop up.

Rolling Mill

The Rolling Mills' Enter Job Detail pop up shows the following fields:

- Master Coil ID
- Width, I.D.
- Sidewall
- Gauge
- Destination Drum I.D.

Enter a Master Coil ID, up to 50 alphanumeric characters, the width of the Master Coil in inches, I.D. (inside diameter) of the Master Coil in inches, Sidewall height of the Master Coil in inches, and Gauge of the Master Coil. The Weight is automatically filled once the previous fields have been entered. Finally enter the Destination Drum I.D. Click "OK" to accept the details and close the pop up. Clicking "Cancel" or the close window icon on the top right of the pop up, will discard the details and close the pop up.

5.5 Work Order End Job

To end a job, click the "End Job" button between the Job Details and Current Statistics viewing panes. After clicking the "End Job" button, the Job End Confirmation pop up will appear. Click "OK" to end the Job and close the pop up. Clicking "Cancel", or the close window icon on the top right of the pop up, will cancel the job end. After clicking "OK", the Job Audit pop up will open.

General OEE

The End of Job Audit pop up contains three rows of data. The first row shows the number of parts counted by OMS. The second row allows the operator to enter the actual number of parts that were made that were considered to be good. The third row allows the operator to enter the number of scrap parts that were made during the Job. Click "OK" to accept the audit and close the pop up. Clicking "Cancel" or the close window icon on the top right of the pop up, will discard the audit information and close the pop up and leave the job running.

Press Brake

The End of Job Audit pop up contains three rows of data. The first row shows the number of parts counted by OMS. The second row allows the operator to enter the actual number of parts that were made that were considered to be good. The third row allows the operator to enter the number of scrap parts that were made during the Job. Click "OK" to accept the audit and close the pop up. Clicking "Cancel" or the close window icon on the top right of the pop up, will discard the audit information and close the pop up and leave the job running.

Slitter

The End of Job Audit pop up opens and allows the operator to edit the end product of the job. The textboxes for the ID, Width, I.D., Sidewall, Gauge, and Weight of the Master Coil are disabled. In the "Enter Sidewall Material Left on Drum" textbox, enter the sidewall height in inches of material left on the master coil drum. The weight of the master coil that is left is automatically calculated and displayed in the "Weight" textbox. The final product dimensions for each mult can be entered in the provided textboxes. Whether a mult was scrap can be specified by clicking the checkbox. The scrap weight is automatically calculated by adding the weight left on the master coil drum plus any mults marked as scrap. This field can be further edited by typing into the "Total Weight of Scrap" textbox, which overrides the calculated value and uses whatever was typed in. Click “OK” to accept the audit and close the pop up. Clicking “Cancel” or the close window icon on the top right of the pop up, will discard the audit and close the pop up. Cancelling or closing the pop up will also leave the job running.

Rolling Mill

Once a job has been ended on a rolling mill the End of Job Audit pop up will open. The End of Job Audit popup allows the operator to edit the final product of the job. The id, width, inner diameter, sidewall, gauge, and weight of the master coil is given. The sidewall height of material left on the master coil drum can be entered in the "Enter Sidewall Material Left on Drum" textbox. The weight of the material left on the drum is automatically calculated and displayed. Click “OK” to accept the audit and close the pop up. Clicking “Cancel” or the close window icon on the top right of the pop up, will discard the audit and close the pop up. Cancelling or closing the pop up will also leave the job running.

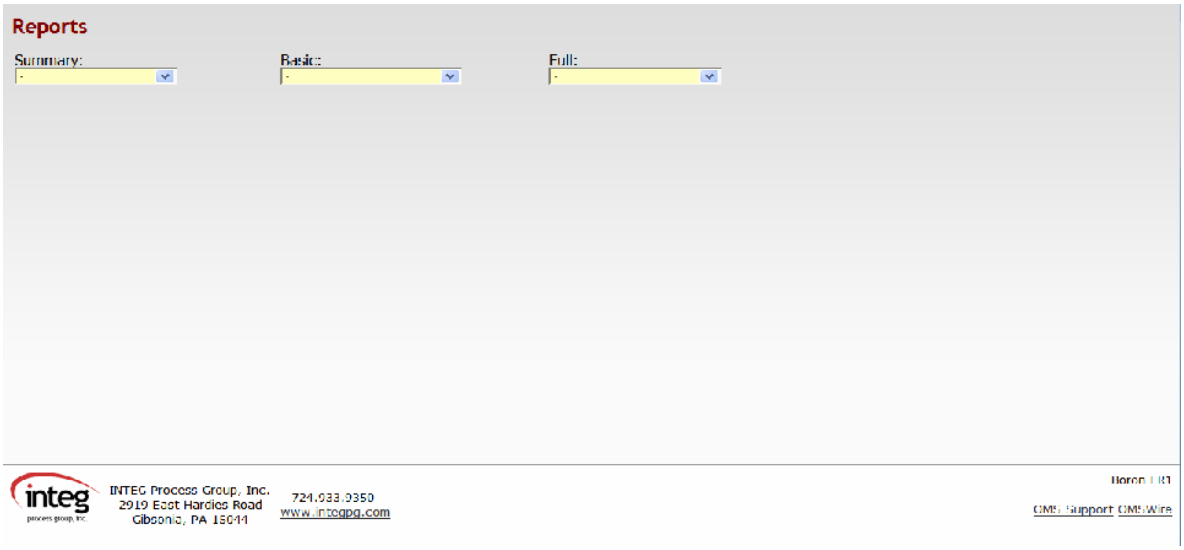
6 Analytics

6.1 Reports

Navigate to the Analytics→Reports page to view the data collected from the plant floor. The Reports give an overview of operations by looking at Work Center utilization. All collected data can be displayed in the Reports in one way or another, allowing a User to view plant efficiency from one place.

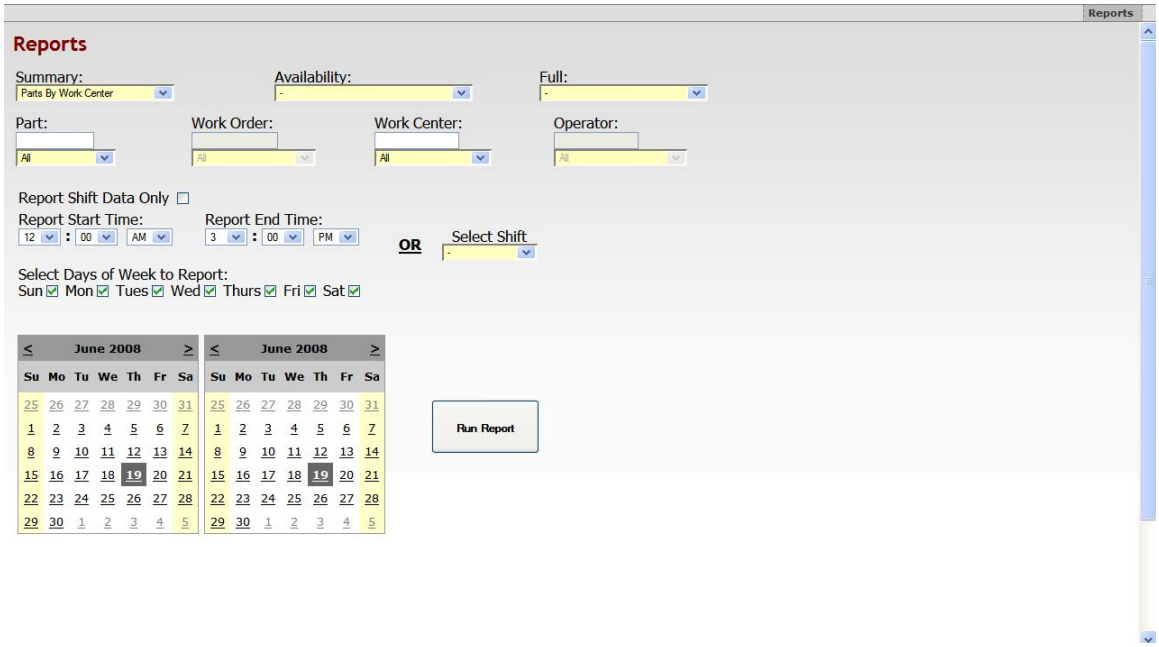
6.1.1 Using Reports

When the Reports page is first opened the only visible objects are the three Report selection dropdowns: Summary, Basic, and Full as shown below.



The Summary reports are the simplest reports, showing very basic data to allow an operator to quickly view the progress for a given time span. Most of the Summary reports give data back in terms of Parts Made. Availability reports become a little more complex and include an OEE calculation. Availability reports rely on the available and running signals from a work center. If a work center does not have those signals there will be no data for it. The Full reports contain the most data possible. These reports use all signals, available, running, and parts made, from a work center to calculate an OEE percentage.

Select a report to use from one of the three dropdowns. After a report has been selected the rest of the report filtering dropdowns and selectors become visible as shown below.



Once a report has been selected the data to be shown in the report should be filtered down to only the relevant information. There are four parameter filters: Part, Work Order, Work Center, and Operator. Depending on the report selected, the parameters available to be selected will change. When a parameter is enabled, by default "All" is selected from the dropdown to use all instances of that parameter. Selecting a specific parameter will exclude all other instances of that parameter. For example if a report allows a work center to be selected, and a single work center is selected from the dropdown, only that specific work center will be shown in the report. However, if "All" is selected from the dropdown, all of the work centers will be included in the report. If there are many entries in the parameter dropdown, the textbox above it may be used to filter the dropdown to show only items which contain the text in the textbox.

Below the parameter dropdowns is the new Run Report as Shift checkbox and the Start/End Time dropdowns. The shift checkbox, when clicked, uses the start time and end times selected as though they are a shift. When a report is run as a shift time, all data outside of the selected time range is removed from the report. For example, when the shift checkbox is checked selecting 8am 6/1/2008 through 5pm 6/2/2008 will show all data from 8am 6/1/2008 to 5pm 6/1/2008 and 8am 6/2/2008 to 5pm 6/2/2008. All data from 5pm 6/1/2008 to 8am 6/2/2008 will be removed from the report. When the shift checkbox is empty the report will show all data from the selected start time to the selected end time. The Start Time and End Time selectors are below the shift checkbox. The Start Time is default to 1:00 am the End Time is default to the next hour from the current hour of the PC clock. Below the time selectors are the day of week checkboxes. The day of week checkboxes will include days which are checked and remove days which are unchecked from the report.

To the right of the Run Report as Shift checkbox and time selectors is the Shift dropdown. When a shift is selected from the dropdown the Run Report as Shift checkbox, Start Time, End Time, and day of week checkboxes are disabled and they are reset to match the selected shift's start time, end time, and days of week. If a shift is wrongly selected from the Shift dropdown or the user wishes to return to manual time selection, to re-enable the Start Time, End Time, and day of week checkboxes, select the "-" from the Shift dropdown. Using the shift dropdown is the most convenient way to show data for a specific time slot. To fully use this function be sure to set up shifts, refer elsewhere for instructions on creating a shift, before running reports.

Below the Run Report as Shift checkbox, Start Time/End Time selectors, day of week checkboxes and shift dropdown are the calendars for selecting the start and end dates of the report. By default the start and end day is set to the current day, except if the hour of the PC is 11:00pm or greater the end day will move to the next day. To select a different day, use the arrows to the right and left of the month to change months then click on the day to select it. Light gray on a day denotes the current day, while dark gray on a day denotes it has been selected.

After the report, parameters, timespan/shift, and day have been selected the report is ready to be run. To run a report click the “Run Report” button to the right of the calendars. When the Run Report button has been clicked, the report page will expand vertically and the actual report will be displayed under the report controls.

The report viewer has several controls at its top. These controls enable the user to move through the pages of the report, export the report to a file, and refresh the report.

To navigate through the report pages, click on the directional arrows. Clicking a double arrow will navigate to the first or last page, while a single arrow will move to the next or previous page. A report page can be navigated to directly by typing the page number into the page textbox.

To export the report to a file, first select the type of file to be created. Choosing Excel will create a .xls file and be opened in MS Excel. Selecting Acrobat (PDF) file, will create a .pdf file and be opened in a PDF viewer. The default viewer is Acrobat. Once a file type has been selected, clicking the “Export” link to the right of the file selection dropdown will send the file and open it.

Clicking the refresh icon on the report viewer control bar will refresh the current view only. The report will not be re-sent to the database and no new information will be refreshed into the report. To refresh completely and ask for new data from the database, re-run the report by clicking the Run Report button again.

Once a report is run, the shift checkbox, start time, end time, start day, end day, days of week, and overriding shift, will be remembered from report run to report run to minimize user interaction while trying to run multiple reports.

7 Preferences

System preferences can be modified by navigating to the Preferences→Status Box page. This brings up two items that can be configured.

The number of columns or machines that can be displayed per row on the work center status overview page can be configured. This number can be chosen to be between 5 and 10 columns.

8 Help

The Help→About page shows the currently installed versions of the pieces of the OMS.