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Barcoded Inventory Tracking System

This system is designed for businesses in the steel roll processing industry which need to track the original manufacturer's or supplier's heat lot number from receipt to final production using barcoded labels. It is also suited to many other businesses which need to track inventory by individual or lot serial numbers, with or without barcoded labeling.

Operation

This system is designed to be operated using a web browser to access a remote server over the internet. Data is stored on the server in a SQL database. Printing is managed through the server spool or piped through IP sockets to printers local to the client site. It is ideal for a distributed operation since the full capabilities of the system can be made available anywhere broadband internet access is available.

Requirements

Client Requirements:

A computer running a W3C compliant web browser that supports AJAX. Firefox is a suitable browser, but Microsoft Internet Explorer is not. You can download Firefox from <http://www.getfirefox.com>. The browser must allow pop-ups from the server, and must run Javascript and handle XML translation using XML style sheets and CSS. These are all basic features of a modern W3C compliant web browser. Internet Explorer is non-standard in its handling of http requests and the document object model and so cannot be used with the full system. Internet Explorer can be used with the limited facilities of the B2B module which at your discretion can permit selected customers access to inventory information and to tracking data on items they have purchased from you.

Barcode label printing is intended for a Zebra printer on 4"x6" labels with a central hole 5/8" from the leading edge and with a 1" high perforated tear-off on the trailing edge. The hole is to attach the tag by means of wire or plastic ties to the inventory. The tear-off carries the serial barcode and other related textual information and can be removed from the inventory and carried for processing in the office when the inventory is shipped or consumed in production. The Zebra 105SL is an industrial quality printer suitable for the purpose. The label format and content can be customised for other printers, tag sizes and layouts.

Reports can be printed on any desired printer with printer selection managed through the browser.

Server Requirements:

The server side programs are designed for Linux using Apache, Postgresql, PHP and Perl. It could be easily adapted to other Unix environments, and there ought to be little difficulty altering it to run on a Microsoft server. Since Windows is a less secure and less efficient environment we have no plans to make a Microsoft version.

User Interface

The user display is in three columns, and is best suited to a 1400x800 display. It can be viewed adequately on a 1280x1024 or 1024x768 display using an appropriate choice of font size. The left column of the screen is the menu and the right column is used for help messages. The center pane is where the data entry and response takes place.

It is possible to use the system without logging in, however only the most basic features will be available to the default user, access will be restricted to an area of the database reserved for training and demonstration, and no labels can be printed.

The browser *Back* button will not work in an AJAX application. Using the *Back* button will simply refresh the screen to an initial state and log you in again.

Login

A user can log in through the menu pane where the user name and password boxes show. Type your user name and password into the appropriate spaces. As soon as the cursor moves off the password box a login attempt will be made. If you are successfully logged in then a confirming message will display in a pop-up and the menu will redisplay to show your company name and all of the options you are permitted to access.

An alternative and more powerful login is provided through the *Configure>Application>Login* area of the menu. Here you can also select the location name if your company has multiple locations and you are allowed access to data at more than one location. You can also select the printer you will use for printing labels if you have access to more than one printer. For simplicity it is recommended that most user logins be restricted to a single company and printer. If you wish to change the printer you are using then you must log in again through the *Configure* menu and choose a different printer.

Once you have logged in, you will be accessing the database space reserved for that location of your company's live data. Your company name will show at the head of the menu, and the current print path will appear below the login space in the menu column. You can also see these settings on the *Help>Status* display.

Your login will be remembered for one hour or until you log off using *File>Log Off*. If you refresh your browser screen or restart the application while your login is current, then you will automatically be logged in again and a message will inform you of the fact.

Using the Menu

The menu represents a table of contents. It automatically expands and collapses to reveal and conceal sub-menus as you navigate through them. To the left of a menu entry there may be a small arrowhead shaped wedge or a dot. These are navigation aids used as described below. Click on a menu entry to expand or select it. If you hold down the *Ctrl* key while clicking a menu option then menus will not be collapsed, but will remain expanded with their options visible.

Only those menu options which you are allowed to use on your login will show on the menu. Other users may see and be able to access more or less of the menu than you can.

A GREEN arrow means the menu entry has sub-items. Click the arrow or the entry to expand it into a sub-list.

A RED arrow signifies a menu which is collapsible. It was a green arrow, but you clicked on it, the

menu expanded and the arrow colour changed to red. You can click a menu entry with a red arrow to shorten the menu.

Clicking a final level entry will make its web page display in the center column, and its help text will show in the right column. Help text for menus may also appear on the right when a sub-menu is displayed.

A RED dot indicates an application entry which you have just clicked it. Its page should be in the center and its help on the right.

A BLUE dot indicates the application entry which you clicked before clicking the red dot (most recent) entry. Since you cannot use the browser *Back* button to return to the previous state, the blue dot helps you remember where you just came from. You can click the blue dot entry to go back to that page. However it will be a fresh, empty page, and any data which you had entered on it will be gone.

Going from an expanded section of the menu to a higher or collapsed section will automatically collapse the current section when the new section expands. Holding down *Ctrl* while clicking a green arrow item prevents this collapse. Doing this has the potential to make the menu get very long. The web page will automatically expand to fit the largest column, whether that is the menu, the help text, or the application pane.

There is nothing to prevent a user having multiple browser windows open on the application. This can be useful when attempting to fill in one form with data that needs to be looked up on another. For instance you can cut and paste item numbers from an inventory enquiry into a sales order.

Language

The menu and associated applications are available in the English language. Though provisions have been made for alternate languages, this feature is not active and no material is currently available in any language other than English. The database is structured in Unicode, so future expansion to other languages is not unduly hindered by any fundamental features of design.

Help

Help text will appear in the right pane whenever a menu option with associated help is selected. Most application panes will have help text, and some of the higher level menu entries will also have help associated with them.

Several help options are available through the menu. The **status** display will show you the state of the server and the programs it is running which affect the operation of your application as well as your current login information. The **versions** display will show you information about the server as well as a history of the recent development path of the application. The **about** display will show you a general overview of the system capabilities and features along with the projected future development path. It is a much condensed but more recent version of the information here in the Application Summary section.

The Application

Summary

Coil steel is received under a lot number called the *heat* which is unique for each supplier. It may have associated chemistry. Chemistry options can be defined as default for your company, with individual overrides for specified suppliers. Coils are received with a specific width and weight.

Coils can be slit into narrower widths in a batch. The weight of the slit coils is calculated on the basis of their width in relation to the width of the coil from which they are slit, allowing for scrap. The heat, supplier and chemistry information will transfer from the master to all of the slit coils.

Coils can be formed into batches (bundles) of tube, flat or other cut stock through the milling operation. Based on the bundle count and size, and the odd lot from the first production coil, an average piece weight can be calculated. Alternatively, based on an average piece weight, the percentage of the coil used can be calculated. The heat, supplier and chemistry information is transferred from the original coil to all of the batches produced on the mill. Actual weights and measures can be entered at various stages of production as an alternative to the theoretical calculated weights and measures.

The convenient *Cut* process will facilitate cutting bundles of a certain length and rebinding into new bundles of varying lengths. As bundles are cut and rebound, running totals of the new bundle piece counts will be managed as new bundle tags are produced according to the cutting pattern. To cope with varying cutting patterns, the piece count of the bundles being cut can be split as desired.

When bundles go for further processing such as swaging, painting or assembly, they may be rebundled in smaller or larger lots. The forming process, which includes the assembly of batches of varying quantities of different parts into a batch of finished goods, provides for tracking the heat, supplier and chemistry information. Tracking is based on the majority composition by weight if items from different heats are included in an assembly.

In essence, *slitting* is a one to many process which uses one item of material to make multiple different (in width) products, and *milling* is a one to one process where a quantity of one item of material is used to make some quantity of one size of one item of product. The *cutting* process is another one to many process which is quantity rather than weight oriented and where the products differ in length rather than width. The *forming* process is a conventional many to one process using many differing materials to produce some quantity of a single item.

A shipping process is provided, with bill of lading printing, to maintain continuity of inventory data. It provides a means to remove inventory from the system by way of shipments to customers or to other locations.

A usage tracking log is employed to provide a full and complete reverse trail for explicit internal tracking of both usage and production. An enquiry, with print option, provides a full trace of the origins of any serialised production, showing heat chemistry and a full explosion of the components and their origins back to the initial receipt.

Electronic documents can be linked or uploaded, and can be associated with a single batch (serial number) or all related batches. Relation is determined by heat if the document is *Chemistry*, otherwise by production work order. Documents are inherited through usage in production and all documents related to any given serial can be fully traced back through all levels of build to the ultimate origins of the materials and components. New documents can be added to the structure at any time.

On the periphery of these core functions are sales order entry, used both to allocate inventory and as a

basis for pricing, work order entry for slitting and milling orders to allocate specific inventory, and invoicing to facilitate billing by combining and summarising bills of lading.

Bar Codes

Bar coded labels are printed for inventory received from suppliers and at each stage of production, for attachment to the coils and bundles. Each label bears a unique serial number which can be used as input, either manually keyed or read by a scanner. Use of barcodes is intended to reduce errors, so scanning is recommended. Tracking by unique serial number ensures that you can trace back any chosen item through its stages of production (by work order and heat) to its original source and chemistry.

Manual tag printing allows for the recreation of damaged tags as well as the addition of new coils or bundles which have not gone through the normally expected processing. Chemistry records will not necessarily exist for manually entered tags. Manually entered coil tags can be updated with chemistry information on the receiving screen.

Inventory

Since the width and weight of coils is altered as they are consumed, and the bundle size is also reduced as pieces are used, it is possible to determine the instantaneous theoretical inventory. An inventory function allows access to current inventory by any combination of supplier, type, heat, item and width for both screen enquiry and printed report, with additional screen print option.

Manual tag printing permits the open ended entry of new data into the system from a source other than coil receiving.

You can also report and enquire on production, showing daily, weekly or other time interval production information, in detail or summary form.

Inventory can be arranged by attributes, such as gauge, material, grade, colour or shape. Since the attributes are user defined and extensible, they can be anything you wish. By assigning attributes to your inventory items, it becomes possible to select inventory by any combination of attributes and to report it in any sequence of attributes. Thus you can have a report by gauge, material and grade, or by shape, colour, material and grade, or any combination you prefer.

Five basic classes or types of item are recognised: master coils, slit coils, tubes, sheets and other:

1. a master coil has an approximate width and irregular edges and the range of widths available is infinite with each coil having its own particular width, and each master coil has its own serial number.
2. a slit coil has an exact width and regular edges, and is made by slitting a master coil into multiple slit coils of any desired width. Like a master coil, each slit coil has its own width, and its own serial number.
3. tubes are kept in bundles, and each bundle consists of items of the same length and has its own unique serial number which all tubes in the bundle share. Tubing is produced by milling a slit coil, changing its shape and cutting it to length. For this reason angle, flat strips and joists would all be classed as different kinds of tube. So would most things assembled from them such as girders, trusses, gates or fence panels. The distinctive features of tube are that it is in bundles and has specific length.
4. sheets are like tubes in that they are produced from coils by the milling process and are in

bundles, but they are two dimensional having both width and length, with weights and costs based on area. For this reason a fence panel or gate might be regarded as being a sheet assembled from tube.

5. other inventory is conventional in that the size is predefined for each item number.

When deciding how to classify an item which might be any of sheet, tube or other, such as a gate, the primary consideration should be the variability in size. If you sell a limited number of discrete sizes then it would be desirable to track your volume of sales by size. By classifying the gates as 'other', with each size having a dedicated item number, the reporting of sales and production by size becomes simple. If your gates are standard heights but custom widths then it would be best to class them as tube, using a separate item for each height and treating the gate width as a length. This way you can determine your sales of 48" high gates separately from 42" high gates. If gates are custom made in any width or height they they are best classed as sheet or you will be creating a new item number almost every time you make a sale.

It is important to be realistic about the classification decision. Even with highly variable sizes of sheet it would probably be better for business intelligence reasons to have discrete items based on width even with gradations of 1/16" from 1/2" to 36" and 1/8" from 36" to 86". A list of a few thousand items is really quite small in the general scheme of things. Most users will likely have fewer than 500 suppliers, 2,500 items and 5,000 customers, with about 10% to 20% of each group representing most of the activity. However, even if these numbers are each five or ten times greater the application should not be getting strained.

Integration

This system is intended to be run in parallel with an ERP system that does not provide heat tracking. It is not aware of the ERP system numbering conventions for items or suppliers, but it does have its own memory of the codes and corresponding names or descriptions fed to it. It can be operated in a mode where each use of a supplier, customer or item code defines or modifies the retained definition of the code, or in a mode where each entry is validated against an approved list. The latter is the recommended method of operation, but the former can be very useful for building your initial data set on the fly.

The obvious points of interface to an external accounting package are when purchase orders are placed, when goods are received from external suppliers, and when invoices are produced to feed an accounts receivable. To track inventory on order the use of in transit inventory is recommended.

Let us say you are operating "Manitoba Roll Processors" and have a factory with an off site warehouse for rolls. If the overall company code is MRP and you have two additional locations, MRP1 for the off site warehouse and MRP2 for the factory, then purchase orders should be placed by initially receiving coils into MRP. Pretending that MRP is the supplier, immediately ship each coil on a separate bill of lading to MRP1 with a due date of its expected arrival from the supplier. The coils on order will then become part of the in transit inventory and can be reported separately from the regular inventory showing the anticipated arrival date. When they do actually arrive, simply entering the BOL reference will bring them into inventory at MRP1 where they will become part of the main inventory. When they are wanted at the factory, they can be loaded onto a truck and sent off as a group on one bill of lading, so that on arrival at MRP2 a single entry of the BOL reference will bring all the coils concerned into the MRP2 inventory ready to be used. An enquiry on MRP inventory will show a consolidated list of everything at both locations, whereas an enquiry on either MRP1 or MRP2 inventory will show only the inventory at that location. An in transit inventory enquiry will show everything destined to arrive at MRP1 or being moved from MRP1 to MRP2.

Once the coils have been consumed at MRP2 to make finished goods, these finished goods will be shipped to customers on bills of lading. A customer who is also using this system can receive the entire shipment, together with chemistry data, using a single entry of the BOL reference. One or more bills of lading can be combined onto a single invoice, with one line for each item and size that was shipped, regardless of the number of coils, bundles or pieces involved. The invoice can then be posted to the accounts receivable of the external accounting system. There is an interface for downloading invoices in XML or IIF (for Quick Books) format that operates in conjunction with reporting a list of invoices.

A customer can be provided with a password that gives access to the B2B portal. Using their web browser they can then look up the available finished goods inventory to see what is available, and they can ask for tracking details on any serial numbered item or lot they have purchased, which will give access to the chemistry and any additional related documents such as material tests or QA analysis.

Costing

Costs can be entered on the receiving screen. The cost should be the total cost of the inventory originally received on that serial number, and a cost per unit weight will be derived by the system based on the weight of the item concerned.

Costs will be passed through the production process in such a manner that the good production (excluding scrap and scarf) inherits material cost from the items consumed in proportion to their overall cost based on weight consumed. This is a fancy way of saying that all material costs get passed up the line to finished goods.

A special inventory report will show the material cost value of the inventory on hand. No attempt is made to record labour or overhead costs or to do activity based costing. Track your labour and overhead through your general ledger.

Future Developments

1. A physical inventory audit process is planned to facilitate the periodic counting of all physical inventory by tag number. This would include variance reporting, but variance disposal would be a matter for manual GL posting. It is intended that inventory counting should be able to be carried out while receiving, production and shipping continue, so there is no interruption in operations because of an audit.
2. Customisation for chemistry by supplier, to permit control of the order and content of the chemistry data collection grid to match individual supplier formats. Support for this feature is present in the design and processing, but not in the current user interface.

Coil Receipts

The coil receiving screen is intended for recording information about incoming inventory. It offers the option of recording chemistry details, which will be linked to the supplier and heat, and will pass through the system to all of the end products made from the coil.

You can receive under a serial number of your own, as long as it does not conflict with any of the numbers currently stored in the system, or you may leave the serial number blank to have the computer assign you a number. If you enter a number which the computer already has used then the details relating to that coil and its chemistry will be displayed, and you will be allowed to edit them.

Begin by filling the right column with data about the coil. The Master Coil is the original supplier's unique coil identifier. The Supplier code is what your company uses to identify the the original

manufacturer or supplier of the master coil. The first time you use this code the computer will not know about the supplier, and you will have to provide the full name of the supplier. After the first time, all subsequent entries of the supplier code will bring up the remembered name. If you alter the supplier name, then the altered name will be associated with that code for the current and all new entries, but past entries will retain the older supplier information.

The Heat is the original supplier's batch control reference, and when entered it will cause the chemistry to fill if it is a known heat. Otherwise you will see a blank chemistry grid into which you can enter the data for this heat. Any changes made to the heat chemistry will affect all of the data in the system which is linked to the heat, not just future entries.

The Item is your company's reference code for the item. If this is the first time the item code has been used, the computer will not know about the item, and you will have to provide the full item description. After the first time, all subsequent entries of the item code will bring up the remembered description. If you alter the description of the item, then the altered description will be associated with that item code for the current and all new entries, but past entries will retain the older item description.

The Order is the internal purchase order or other reference through which this coil was bought, shipped or received. You should be consistent in your choice of the type of document reference you put in this space. The purchase order number is recommended but the goods receipt reference or bill of lading might also be useful alternatives.

Measurements may be separately maintained as theoretical (what you ordered, expected to receive or were informed on supplier shipping documents that you had received) and actual (based on your own measurements of the item you received).

The Width is the width of the coil in your preferred units of measure, most likely inches or centimeters. It does not particularly matter which you choose, but it should be only the numeric portion and should not include the unit of measure. It is very important that you should be consistent in your choice of units and always use those units for all of the entries you make for your coils. If you decide to do everything in inches and then later change to centimeters, it will be necessary to convert all of your current coil inventory widths and reissue the labels for the affected coils. The width number is used in the slitting operation to calculate the weights of the slit coils, which is why it must be a number and why you must always use the same unitary basis for recording widths.

The Weight is the weight of the coil in your preferred units of measure, whether pounds or kilograms. As with width, the weight must be only the numeric portion and should not include the unit of measure. It is very important that you should be consistent in your choice of units and always use those units for all of the entries you make for your coils. If you decide to do everything in pounds and then later change to kilograms, it will be necessary to convert all of your current coil inventory weights and reissue the labels for the affected coils. The weight number is used in work order processing operations to calculate the weight of the items being made, which is why it must be a number and why you must always use the same unitary basis for recording weights.

Thickness is the actual thickness of the material you have received based on your measurements.

Cost is the total cost (inclusive of shipping, unrecoverable taxes and other expenses) for acquiring the item as described on this entry.

Chemistry only needs to be filled out the first time an item from this heat is obtained from this supplier. Any changes to the chemistry will reflect on all of the coils and production associated with the heat, including previously received coils and past production. You should be careful about making alterations to existing chemistry data.

Maintenance of your records is a separate task from printing tags. Printing is optional. If you do not wish to print tags, simply record the serial number generated by the computer, which will display in the top left box, and write this number onto the coil or on a cardboard tag which you attach to the coil. When the coil gets used, the number can be entered into the computer as material on a work order. If a tag is employed then it can be removed and carried to a central computer station for entry as material. In the absence of a tag, the number must be copied down for entry on a workstation. The advantage of using barcoded tags with a scanner is reduction in transcription and typing errors.

Slitting a Coil

When a master coil is slit into multiple slit coils the weight of those resulting coils can be calculated from the relationship of the widths of the slit coils to the width of the original master coil and the weight of that coil. The total width of the slit coils must not exceed the width of the original master, and the scrap should not be excessive. The computer will maintain a count of the coils and of the unassigned remaining width.

Begin by entering a work order reference for this job, followed by the unique internal serial number for the coil to be slit. The computer will retrieve and display its width and weight.

On the spreadsheet display, in any pair of cells, enter the width and the number of coils of that width to be cut. Each time you enter a number of coils, the screen will recalculate to show you the total number of coils to be made and the total width remaining.

You may only enter numbers in the spreadsheet. Each entry will be checked by the computer to make sure it is a number. Decimals may be used. The slit widths must all be in the same unitary basis (inches, centimeters or metres) as the master coil width, and they may not total more than the master coil width.

Once all your data has been entered, generate and print the tags for the new slit coils. When the computer has generated entries for the new slit coils and sent the tags for printing, the count of tags will be displayed, and should match the calculated count on the screen.

The new slit coils will be added to the inventory, and the master coil width and weight will be removed from inventory. It will therefore not be possible to use the same master coil a second time to produce slit coils.

An opportunity is provided, prior to printing the tags, to enter actual weights for the new slit coils based on your measurements. At this point, if an error in the process is detected, the new inventory can be deleted, the master coil weight reinstated, and the process repeated with a corrected slitting pattern.

If an error is made it is also possible to delete the new tags through the manual tag screen and/or the receiving screen, and correct the master coil entry using the receiving screen or the manual tag screen to restore the original width and weight, prior to doing the process over correctly.

Milling

A key process is that of changing coils into batches of strips, tubes, angles, stampings or other like forms. The Milling procedure is used to take a succession of slit coils and make such batches of finished or intermediate goods from them.

Begin by entering a work order reference for this job, followed by the unique internal serial number for the coil to be processed. The computer will retrieve and display its width, weight and other information.

Next provide details of the bundles of production to be made from this coil. You may make any number of standard size bundles, including zero, and an odd lot number of pieces. The odd lot is that extra quantity made from the coil which is less than a standard batch size. The scrap quantity is that number of pieces which are not usable. They may have been damaged in the course of production or part of the setup process, but they must be counted and entered here if the average piece weight and production yield are to be accurately calculated.

You must also provide an item code for the batches to be produced. If this is the first time the item code has been used, the computer will not know about the item, and you will have to provide the full item description. After the first time, all subsequent entries of the item code will bring up the remembered description. If you alter the description of the item, then the altered description will be associated with that item code for the current and all new entries, but past entries will retain the older item description.

A few other important details must also be provided, and there are a number of ways to handle these.

1. You can provide a standard weight for each item of production by entering it into the Average Piece Weight box.
2. You can have the computer calculate an average piece weight by leaving the Average Piece Weight box empty. Make sure that you have put the correct quantities into the standard bundle size, bundle count, odd lot and scrap quantity boxes. If less than the entire coil is used, then enter a percentage used for the coil. Beware that the average piece weight calculation will only be as good as your estimate unless the entire coil is used.
3. You can supply an average piece weight and have the percentage of the coil used calculated by checking the Calculate box next to the Percent Used box. The percentage calculation will be based on the bundle size and count, the odd lot size and the scrap quantity.

Ordinarily a production run of several coils of the same heat will produce some bundles which are made partly from one coil and partly from the next. The normal way to operate the Milling process in these circumstances would be as follows:

1. If you are calculating the Average Piece Weight on the first coil consumed, then provide accurate numbers for bundle size and count, odd lot size and scrap. Make sure that the Odd Lot Tag checkbox is unchecked. You do not want a separate tag for the odd lot, but the odd lot quantity is needed for the piece weight calculation.
2. If you are not calculating the Average Piece Weight then it is sufficient to provide only a bundle size and count for the number of tags you require.
3. If the odd lot size exceeds half a standard bundle then an extra standard bundle tag will be printed for the odd lot, and the first pieces made from the next coil will be added to make up a standard bundle for that tag.
4. On the next coil, provide only the number of standard bundle tags you need for bundles made from that coil. You do not need to enter an odd lot size. If you do enter an odd lot size then it should be only the extra quantity from the back end of the coil. Do not include any odd lot from the front end used to make up the odd lot from the previous coil into a standard bundle. Entering an odd lot size will cause no problems, but if the odd lot quantity exceeds half a bundle then a standard bundle tag will be printed for it.
5. Continue in the same manner as for the second coil until you come to the last coil of the run.
6. On the last coil, be sure to enter an odd lot count for the last of the production if it is less than a standard bundle, and make sure the Odd Lot Tag box is checked. This will cause a tag to be produced for the odd lot with a correct piece count. It will also ensure that the yield calculations for the work order are correct.

You would also normally request an odd lot tag if you are changing to a different heat with the next coil, even if the work order is not complete. You would want an odd lot tag so you can keep the production cleanly separated by heat. If this is not strictly necessary for the production run in question then you can allow the system to generate a standard bundle tag based on the majority composition of the bundle by weight. You do this by entering an odd lot size but leaving the Odd Lot Tag box unchecked. Beware that doing so when changing heats does not comply with ISO requirements for heat tracking and a regular practice of this could compromise your certification.

In summary, Bundle Size is the number of pieces in a standard bundle: each bundle gets one tag. Bundle Count is the number of standard bundles from this coil. The Odd Lot Bundle Size is the number of pieces over which don't make a standard bundle. If Odd Lot Tag is checked then a special tag for the odd lot will be printed; not checked means a standard bundle will be made up from the beginning of the next coil. Scrap is the number of unusable pieces including setup. Any entry in the Average Piece Weight will be used as the standard, or it will be calculated on the first coil by using coil weight and piece count.

Once the tags are generated, a list of them will appear below the main entry screen. You can enter actual bundle weights on this list prior to printing tags. You can also delete the tags and redo the milling process with any changes needed to correct the processing.

Cutting Bundles

When tubing is cut into multiple pieces the weight of those resulting pieces can be calculated from the relationship of the lengths the cut pieces to the length and weight of the original tube from which they were cut. The total length of the cut pieces must not exceed the length of the original piece, and the scrap should not be excessive. The computer will maintain a count of the pieces and of the unassigned remaining length.

Begin by entering a work order reference for this job, followed by the unique internal serial number of the first tube bundle to be cut. The computer will retrieve and display its description, length and piece count.

On the spreadsheet display, in any line, enter the bundle size, cut length and piece count cut from each original length. Each time you enter a line, the screen will recalculate to show you the total number of pieces to be cut from each length and the total length remaining.

You may only enter numbers in the spreadsheet. Each entry will be checked by the computer to make sure it is a number. Decimals may be used only in the length column. The lengths must all be in the same unitary basis (inches, centimeters or metres) as the bundle being cut, and they may not total more than the piece length of that bundle.

Once all your data has been entered, generate and print the tags for the new cut lengths. The computer will generate a new piece count for each line, and produce tags for each complete bundle which results. Part bundles will remain on the screen showing a piece count and serial number. As more bundles are cut, the resulting pieces will add to this count causing a new bundle tag to be generated and the surplus carried over to a new serial number. When the last bundle is being cut, checking the 'Odd Lot Tag' column for any remaining part bundles will cause tags to print and the balances to clear.

The new cut bundles will be added to the inventory, and the cut bundle piece count will be removed from inventory. It will therefore not be possible to use the same bundle a second time to produce cut bundles. If an error is made and the wrong bundle is cut, then the new cut bundle tags should be deleted using the manual tag screen, and the original bundle should be revised on the manual tag

screen to restore the original piece count prior to doing the process over correctly.

If the cutting pattern is complex, in that one or more bundles being cut are split, then by altering the piece count of the bundle being cut to suit each cutting pattern required, any cut can be accommodated. For example, if a bundle of 61 pieces of 24 feet length are being cut into 8, 4 and 9.5 foot lengths in a ratio of 5:2:1, then you could proceed as follows:

cut quantity set to 42, and pattern of 9.5ft x 0, 8ft x 3 and 4ft x 0 = 126x 8ft

cut quantity set to 6, and patten of 9.5ft x 0, 8ft x 0 and 4ft x 6 = 36 x 4ft

cut quantity set to 12 , and pattern of 9.5ft x 2, 8ft x 0 and 4ft x 1 = 12 x 4ft + 24 x 9.5ft

cut quantity set to 1, and pattern of 9.5ft x 1, 8ft x 0 and 4ft x 3

final total is 8ft x 125, 4ft x 50 and 9.5ft x 25 (5:2:1 ratio)

with 8ft x 1 and 4ft x 1 surplus

and 2.5 feet scrap

Each time you generate tags, a list of the new tags will be placed below the cutting grid where you can enter actual bundle weights. You can also delete the tags just generated and restore the list to its former state to alter and retry the processing.

Assembly Work Order

The Assembly Work Order (menu option *Form*) can be used not just for assembling a number of components into a finished product, but also for changing a product from one form into another, for example, swaging or painting a tube.

Begin by filling in the top portion of the form and providing a work order reference, and an item code for the item being made. If this is the first time the item code has been used, the computer will not know about the item, and you will have to provide the full item description. After the first time, all subsequent entries of the item code will bring up the remembered description. If you alter the description of the item, then the altered description will be associated with that item code for the current and all new entries, but past entries will retain the older item description.

Bundle Size and Count, Odd Lot size and Scrap count are used very much as in the Milling process. If you understand Milling, then Assembly should prove no difficulty. In summary, Bundle Size is the number of pieces in a standard bundle: each bundle gets one tag. Bundle Count is the number of standard bundles made from this batch of components. The Odd Lot Bundle Size is the number of pieces over which don't make a standard bundle. It will normally only be used at the end of an assembly run to produce a special tag for the odd lot. Scrap is the number of unusable pieces including setup and will normally be entered with the final batch of the job. Any entry in the Average Piece Weight will be used as the standard piece weight, or if left empty it will be calculated on the first batch using the sum of the component weights and piece count from the standard bundle.

In the ordinary course of events components will all be from the same heat. If they are not, then the heat assigned to the production batches will be that represented by the majority of the components by weight. Since components are tracked, it is a simple matter to reconstruct from the system the composition of any particular bundle of production.

Ordinarily your processing will conform to one of the following models:

1. You are making a one to one transformation such as swaging or painting tubing, possibly with a change in bundle size. If the bundle sizes are the same, scan the tag for one component bundle

and click the button to produce one production bundle tag. Continue in this manner until the last bundle of components has been entered, and at this point provide a zero bundle count, an odd lot size and a total scrap count to finish off the work order.

2. As in (1) above, but components are from two or more separate heats. In this case treat each heat separately according to the procedure in (1), with an odd lot size and scrap count on the final bundle of each heat in order to keep the heats cleanly separated.
3. You are assembling from multiple components, for example making a fence panel or gate from different bundles of tubing and crates of stamped fastenings. Scan in the serial numbers of component batches, altering the quantity used to reflect the quantity required for complete bundles of finished production as specified in the top portion of the screen. Be sure to include sufficient of each required component to make the product bundles.

If you are entering the Average Piece Weight of the finished product then be sure to include the actual quantities of component used on every bundle. If you are calculating the Average Piece Weight then in addition to the actual component quantities be sure to include the scrap count for any damaged production or setup pieces. Alternatively you may base the first bundle on the theoretical parts list and carry forward an excess usage and scrap to the second bundle in order to get an accurate initial piece weight. The calculated piece weight will then be used for all subsequent bundles.

Click the button to produce one production bundle tag. Repeat the process for successive production bundles ensuring that the actual quantity of component used is entered. If at any stage there is insufficient component in one bundle to produce a complete finished bundle then you may need to scan multiple tags for the same component to satisfy materials requirements. Continue in this way until the last production bundle, at which time enter an odd lot quantity (if appropriate) for the final bundle and generate your final tag.

Scrap count is only important on the first bundle, and only when calculating the Average Piece Weight.

4. You are doing a one for one transformation where the bundle sizes do not match. In this case proceed as (1) or (2) above, but on each batch of finished production be sure to enter sufficient component bundle(s) to make the production bundle, altering the quantity on the final component bundle to match up to the requirements of the production bundle.
5. It is possible to enter all of the component bundles used and generate all of the production bundles in one shot, provided you supply a correct component usage for partially used bundles, and a correct scrap count OR manually enter an average piece weight (in which case you can leave out the scrap figure). This is not advised because the computer will assume that each production bundle is made from proportions of each component bundle, making the tracking excessively complex. However it is a handy shortcut and you may consider the savings in data entry labour to be well worth the relatively more complex serial tracking trail.

Whenever you enter a component Serial, which is the unique internal serial tracking number for the component bundle, the component grid will fill with related data and move down, with a new entry inserting at the top of the list. Altering the quantity used to zero will effectively remove an item from the component list for the purpose of consumption and tracking (though it will remain present on the display).

Each time one or more tags is generated, the list of components will clear. The quantities of any partly used component bundles will be altered to reflect the quantity used. Do not scan a serial number into the components list more than once for the same production bundle.

Manual Tags

The Manual Tag processing exists for five important purposes:

1. To provide a means of reprinting damaged tags.
2. To provide a means of maintaining the serialised inventory apart from the standard procedures for the purpose of correcting errors and omissions.
3. To provide a means of entering existing inventory information at the initial startup of system implementation.
4. To enable the creation of tags only at the point of shipping, by normally directing all tag output to the default null print collector and only printing tags for the goods you ship.
5. To provide for reprinting tags for the new quantities on partially used bundles and coils. Since the system maintains the true inventory count a manual alteration to the original tag quantity is all that is strictly necessary, but for tidiness or audit purposes it may be desirable to have accurate computer generated tags on all inventory.

Use of the manual tag process is simple and self-evident for anyone familiar with the other procedures. It is very similar to coil receiving with the omission of chemistry.

If you are working with an existing tag, scan or type its serial number in the upper left box, and the tag data will fill the rest of the screen. You can then make corrections, save and/or print this information, or delete the tag as necessary. In the ordinary course of events tags should NOT BE DELETED. Instead their current quantities should be amended to zero.

If you are adding a new tag, you may supply a serial number for the tag. You leave the serial number empty or provide a number which is already in use when adding a tag, then a new serial number will be generated for your addition and displayed in the serial number box.

Your choice of Type will determine the format of the form. It will change to tube or coil format according to what you select. The Master Coil is the original coil reference (the supplier reference on masters, or an internal serial number on slits and bundles) indicating where the inventory originated. The Supplier code identifies the original manufacturer or supplier of the master coil, and if already known to the system will cause the Supplier name to appear on the form. Otherwise type in the Supplier name as well, and the system will remember it for future use. If the Supplier name is incorrect, the one displayed can be changed, in which case it will henceforward be connected with that code. Changes to the Supplier name will not affect other data already in the system.

The Heat is the original supplier's batch control reference. It may be associated with coil chemistry, but chemistry can only be viewed or edited in the Receiving process. The Item is your company's internal reference code for the item and is associated with a Description. If the item code is already known to the system, entering it will cause the Description to appear on the form. Otherwise type in a Description as well, and the system will remember it for future use. If the Description is incorrect, the one displayed can be changed, in which case it will henceforward be connected with that code. Changes to the Description will not affect other data already in the system.

Bundle Size is the count of the items in this bundle, and is not used for coil inventory. Width is the width of the coil in your preferred units of measure and does not apply to bundled inventory. Be consistent throughout in the units you use for recording coil widths, and ALWAYS use one and only one of inches, metres or centimeters as your basis for width measurement. Weight is the weight of the coil, or the weight of one unit of bundled inventory, in your preferred units of measure. Be consistent also in your use of weight units and ALWAYS use one and only one of either pounds or kilograms

according to your preference.

If you should ever wish to change the basis of your width or weight measurements to or from metric or imperial, you will need the assistance of a database administrator. Contact your technical support well in advance to arrange any such change.

Shipping

The shipping procedure provides a means of removing inventory from the system as well as a way to use the serialised tags to assemble a bill of lading.

If you scan or enter a known Shipment number (bill of lading reference) then the details of that shipment will appear on the screen. If you are adding a new Shipment you may leave this space blank to have the computer assign you a Shipment bill of lading number, or you may supply a unique number of your own. If your number is found to already be in use when adding a Shipment, then the computer will reassign you a new number for your Shipment.

The Ship To code refers to a customer. If already known to the system, the customer name and address will appear in the space below, where you may modify it if necessary. Changes made to the customer information will not affect prior shipments, but will be remembered and so will affect other future shipments. Bill To also refers to a customer. Shipping and billing names and addresses can differ if you provide them with different codes. It is a sound policy to assign unique but related codes to a group of codes, for example ABC40 may be the ABC Manufacturing Company main office where bills are sent, and ABC4010 may be their facility in Quebec, while ACB4020 and ABC4022 are their two Ontario facilities. Any data entered in the name and address spaces, or changes made, will only be stored when the bill of lading is printed.

The Ship To code may be the company code of another company using the system. The other company may be a separate warehouse or factory of your own. In this case, the inventory represented by the bill of lading can be received in bulk by the destination company using the Receive>BOL function. Any shortages or damages must be handled after the fact using Manual Tag adjustments. This provides a quick, simple and efficient method of transferring inventory between locations.

You may scan or type in a series of Serial numbers for the goods to be shipped. As each is entered, the relevant information will be added to the list of items being shipped, and the list will move down, allowing a new entry to be inserted at the top of the list. If you provide a serial number already in the list, that coil or bundle will be removed from the list.

As the items to be shipped change, the Weight, which is the theoretical total weight of the shipment will increase. If you are using pallets, bindings, wedges or other packaging, that weight will not be included. This total theoretical weight may help serve as a guide to prevent overloading. The Bundle Count will also automatically increment as tags are entered. It can be used as a quick check on the total load to help ensure that nothing has been missed.

When you scan a tag into the list it is immediately removed from inventory to prevent adding it to the shipment more than once. It is restored to inventory if you delete it from the shipment list. As soon as you add the first tag to the shipment, a bill of lading number is created (if necessary) and displayed in the top left as the Shipment number.

The shipment data is updated when the 'Save' button is clicked. Since items on the BOL are automatically recorded, the 'Save' process is present to record all of the details in the upper portion of the screen above the list of serial numbers to be shipped.

Printing is done through the currently assigned print device in a standard format using the default fonts

for the printer. It may be used as a basis for preparing export documentation, as a load sheet, or as a basis for invoicing through your accounting department.

Sales Orders

The purpose of having sales orders is two-fold. First is to provide a means of allocating inventory, and second is to provide pricing as a basis for invoicing. Sales orders will allocate finished inventory, but used in conjunction with work orders they can allocate the components needed for manufacture. By linking a work order to a sales order item, you establish the source of supply for the finished goods to meet the order.

The work order materials list establishes what specific inventory will be used for the purpose. A coil in inventory at any company location or currently in transit can be on the materials list of a work order and so reserved for use to produce one or more items on one or more sales orders. The basis also exists for reporting how a particular roll is to be disposed of since the work order on which it is to be used determines how it is to be consumed and for what sales orders.

By placing a sales order of zero value to be shipped to one of your own locations, you can reserve all or part of a roll to be turned into stock in some other form (tube, sheet, slit coil ...).

Work Orders - Slitting

A slitting work order is handled very much like slitting production, except that you are specifying multiple coils to be slit with an aggregate weight and minimum width. Each discrete slitting pattern for a discrete item constitutes a single work order. If gauge, material and grade are part of the item characteristics then only one particular combination of gauge, material and grade can be slit on one work order, and the pattern of coils to be produced from each roll must be the same. You cannot slit eight six inch coils from one 48" roll and six eight inch coils from the next. Instead you must slit four six inch and three eight inch coils from each of the two 48" wide rolls.

The slitting work order creation is driven by first allocating one or more roll serial numbers as material, and then setting up a pattern for slitting the narrowest of these. This pattern will be applied to all of the allocated rolls. Yield percentage and total waste are calculated for the result.

Work Orders - Milling

A milling work order is handled very much like milling production, except that you are specifying multiple coils to be milled with an aggregate weight and uniform item number and width. The total planned production is given by weight, quantity and bundle count to assist with planning.

Invoices

Invoices are made by collecting one or more bills of lading for the same billing address and customer PO onto one list of billable items.

If a BOL consists of only one item in two different sizes then the invoice will consist of two lines, one for each size of the item. If a second BOL is added with the same billing address and it consists of two different items of the same size, and one of these item/size combinations is on the first bill of lading, then a third line will be added for the new item/size and the quantity of the other item/size already on the invoice will be increased. Item pricing is based on the sales order pricing which is derived from the sales order reference on the BOL. For items to be combined they must have the same price, so a single item and size can have more than one line if the prices differ.

Once all BOLs have been added to the invoice it can be saved. Saving will cause the taxes to be calculated. The taxes will depend on what the company is required to collect, what the customer is required to pay, and how the items on the invoice are taxed. If another BOL is subsequently added to the invoice then when it is saved again the taxes will be removed and recalculated.

Once an invoice has been saved it can be printed. After the first printing, every subsequent printing will result in 'COPY' being added to the result. Once an invoice has been printed it cannot be altered by adding any more bills of lading.

An invoice can be voided. This does not delete it, but releases its bills of lading to be reused on other invoices. Otherwise, once a bill of lading has been added to an invoice and the invoice has been saved, the bill of lading cannot be put onto another invoice. A bill of lading cannot be added to an invoice more than once.

Documents

Electronic documents can be added to the system as either links or uploads. Individual uploads must not exceed 200KB and can be in GIF, JPG, PDF or TIF (fax) format. Paper documents can be scanned to be transformed into an appropriate format, and edited with an image editor if necessary prior to upload. An electronic document which is accessible on the web (either internet or intranet (LAN)) can be linked to the database.

Specify a document type. Selecting *Chemistry* offers the possibility of relating the document to all serials which share the same *heat*. Other document types are related to serials from the same production work order. Relationships between serials and documents is established when the document is entered and applies only to the state of the relationships at that time. Serials created after the document is entered will not be automatically associated with the document. Changing a heat or work order on a serial after the fact will not break existing or make new document relationships. Documents should therefore be added only after all related serials have been created. If a work order is produced in batches and tested at intervals with test certificates issued, then the work order should be changed between batches so that the test certificates can be properly related to relevant serials.

A description can be assigned to the document. The description will appear as a clickable link on all displays which reference the document. Notes can be attached to the document and will appear on displays which reference the document.

Documents will be filed under the document name (or the optional filing name) for uploads or under the required link name for links. The document or link name must be unique for your company. If you upload a file with the same name it will replace any existing document. A link must be specified as the full browser-accessible internet address: www.xyz.com/link.pdf is not acceptable, but <http://www.xyz.com/link.pdf> is correct.

If you create new serials for the document after uploading or linking it, then you should repeat the upload or link creation in order to add the new serials to it. Notes and description can be changed by a repetition of the document creation. A document cannot be deleted, but can be replaced with an empty image or link.

Item Numbering

Since the slitting and cutting processes work on the basis that the item number of the input and output is the same, and only the length or width is changing, the system is assuming that you do not build in length or width as part of your item numbering system or item descriptions. Width is therefore

infinitely variable for coils, and length is infinitely variable for tube. For sheet made in the milling process, both width and length are infinitely variable, and width is inherited from the coil from which the sheet is made while length is defined by the milling process. If sheet is subsequently cut into narrower strips, then this is accomplished using the cutting process just as if the sheet were a tube being cut into shorter lengths. If a bundle of sheets is to be cut into strips width-wise rather than length-wise then it must first be rotated so length and width are interchanged.

Many companies tend to adopt item numbering systems intended to summarise characteristics of the item. This is a simple and effective means of handling inventory but can lead to very large codes. Incorporation of new features can be difficult. It has the merit of being simple to understand and implement. The following remarks are intended as a guide to using such a structure. There is a more useful method available which can be used in conjunction or as an alternative. For details see the section on Codes, especially Item Attributes.

For example, coils would typically only indicate their thickness and material, so an 0.090 thick HRPO coil might have an item number of 090HRPO regardless of width, so that coils slit from an 090HRPO master will also be 090HRPO, with only the widths and weights changing, and the description for 090HRPO would be something like 90G HOT ROLLED PICKLED IN OIL.

Similarly a tube will normally only be indicated by gauge, shape, cross section measurements and wall thickness, so 100R1667HR might be a 0.100 wall round tube of 1.667 inches diameter made of hot rolled steel and described as 100G RND 1.667 HOT ROLLED regardless of length.

In this way, since reports can be selective by width and length, and width or length is shown on the tags and the serial records, these characteristics can be kept distinct from the item description, and searches can be made by material, gauge and cross section using the item number. Segregating the inventory by width or length for enquiry or analysis is no problem since it is all managed by serial number, and each serial number is homogeneous as to width or length. Reports can easily aggregate serials to report inventory, production or shipping information totals by item and width or length.

This may not fit with how you manage inventory in your ERP. Customisation of the slitting and cutting processes is possible, to transform items and descriptions as well as sizes. However it would entail the entry of more information and require a significantly larger working display area.

Codes

A variety of codings in the system are dynamic and can be used to alter the content of basic tables and in some cases affect the manner in which the application functions.

System code maintenance affects all companies and is available only to the overall administrator(s) of the system. It affects such codes as countries, provinces and states, telephone areas and other globally applicable data.

General codes are company specific but affect the manner in which the application operates for the company. Item classes (Master, Slit, Tube) and item attributes are examples of general codes.

Allowed code types include:

- Attribute: a sortable and selectable characteristic of an item, customer or supplier.
- Doctype: a classification of document. 'Heat' is a particular doctype which groups by heat lot. Other doctypes group by production work order and are user defined.
- Type: a sortable and selectable characteristic of inventory items which is the major classifier to which attributes are subordinated, also variously referred to as 'class' or 'kind'.

- Tax Codes: a hierarchy of codes for calculating taxes, consisting of Taxauthority, Taxcode and Taxrate. Tax authority codes are assigned to company locations, customers and items. The tax calculation then applies those tax rates which are common to all of the tax authorities involved. For example, if your warehouse located in Ontario is coded with a tax authority to collect both PST and GST, and your item is also coded as subject to both these taxes, but your customer is coded with a tax authority to collect only GST because they have filed a PST exemption certificate with you, then only the GST will be common to all, and only GST will be charged.
 1. Taxauthority is a code with a description that links to one or more tax codes.
 2. Taxcode belongs to one or more tax authorities, is linked to one tax rate, and has a sequence that determines the order in which the taxes are applied. If the description of the Taxcode entry is 'add' then the tax rate to which it refers will be a tax on preceding taxes.
 3. Taxrate belongs to one or more tax codes and carries in the sequence field the tax rate to be levied expressed as a percentage. It also has a description which will print on the invoice and is used as the posting account for Quick Books IIF transfer files.

Item Attributes

Item Attributes are attached by item class, but are managed independently of the classes to which they are attached. For example, Gauge might apply to both Master and Slit Coils and to Tubing. You would set up codes for Gauge, and then attach Gauge to Master, Slit and Tube. All classes would then see the Gauge data. If you wanted to keep Tube Gauges separate from Coil Gauges, this could be done by referring to Wall for Tube and Gauge for coils, and maintaining the series of codes for Gauge and Wall separately from one another.

Suggested attributes for coils are Gauge, Material, Grade and Treatment.

Suggested attributes for Tube are Gauge, Material, Grade, Treatment, Shape, Diameter (use two of different names for rectangular and oval), Colour, Finish and Swage.

Using item attributes allows you to describe items independently of their numbering. This simplifies the creation and use of new numbers, reduces the scope of the item numbering series and allows for simple and direct use of item attributes for sorting, reporting and enquiries.

You can employ item attributes alongside an item numbering system that assigns meaning to portions of the item number. By separating out the key item number components as attributes you gain direct access to them for selection and ordering of reports, while the structured item number can still be used as a key for enquiries.

One company can be associated with other companies as their parent. Child companies have the parent company code attached to their record. Codes are maintained by the parent company and apply to the parent and all of its child companies. This simplifies and standardises the code maintenance across all subordinate organisations. Child companies might be warehouses and factories at separate locations, or possibly at a single location when the inventories or processing are to be kept separate.

Reporting

Tracking

The serial tracking enquiry, which can also be printed, provides a detailed history of the origins of any desired serial, including chemistry data for the heat, if it has been entered into the system. The entire history will be traced back through all levels of production to the original receipt. Obviously this only works if you have been using the procedures offered for recording production activity, and will not apply to manually entered tags which have no associated production activities.

If assembly or post-milling forming has been done as part of these procedures and recording of the production has been done on a bulk basis (entering all of the components and generating multiple tags using a bundle count higher than one), then all of the component serial numbers are proportionally assigned to each and every tag produced. This can result in a complex repeating tree of components, which you can simplify by ensuring the Hide Duplicates box is checked.

Once the display is on the screen you may click the Printer Friendly Version button to have a new window opened containing only the enquiry result. You can then use your browser's printing capabilities to produce a printed result.

The document tree can also be tracked in a similar manner. Documents are shown as clickable links within the production structure, but only the first occurrences, without repetitions. Documents can be opened and printed from your browser.

Inventory

You can select a range of inventory for reporting, a useful feature for obtaining a list of potential materials for shipping or for use on a work order. Inventory can be selected by specifying a type and a range of item, supplier, heat or width. If a range is not specified then all inventory will be selected.

For example if you pick slit coils, a width range from 5.125 to 5.375, and a heat range from HT1878 to HT1878 then all slit coil inventory (masters will be excluded) with heat HT1878 will be selected regardless of its item number or supplier, provided the coil width falls into a range from 5.125 units to 5.375 units. Depending upon your company's conventions those units may be inches or centimeters.

If you specify a lower bound for a range then you must also supply an equal or greater upper bound for the range. If you supply nothing for a range (eg. the supplier from/to range is blank) then that range will not be applied (ie. all suppliers will be included).

The inventory enquiry result will be displayed in a separate window. You can then use your browser's printing capabilities to produce a printed report.

Inventory can also be reported in sorted sequences based on attributes. If you have assigned attributes to your inventory items then the inventory by attribute reporting function can be used to select the inventory you report by attribute range. The order (top down) of the attributes selected will determine the order of your inventory report. When selecting an attribute only for the purpose of determining the report sequence, use a range from blank to zz to select all inventory for the attribute.

Production

If you are using the slitting, milling and forming screens to generate tags for your production processes, then a report of that production can be produced. Production can be reported by type (coil or bundle)

for selected ranges by date, order, item, supplier, heat and width. Selection rules parallel those for the inventory report. If a range is not specified then all inventory will be selected.

For example if you pick slit coils, a width range from 5.125 to 5.375, and a heat range from HT1878 to HT1878 then all slit coil inventory (masters will be excluded) with heat HT1878 will be selected regardless of its item number or supplier, provided the coil width falls into a range from 5.125 units to 5.375 units. Depending upon your company's conventions those units may be inches or centimeters.

If you specify a lower bound for a range then you must also supply an equal or greater upper bound for the range. If you supply nothing for a range (eg. the supplier from/to range is blank) then that range will not be applied (ie. all suppliers will be included).

You can limit the extent of the report to a maximum number of entries, with 400 as a default. If you use bulk recording of assembly or forming processes then you should set this limit relatively higher. Processing of large quantities of data may take a significant time, so setting date limits would be helpful to reduce server load and bandwidth requirements. You can shorten the length of the report if the Summary by Work Order box is checked.

The production report will appear in a separate window and can be printed from there using your browser's printing capabilities. The company headings and parameters will appear only on the first page.

System Maintenance

Users

Users can be maintained through the *Configure>System>Users* menu entry. Use of this screen is restricted to administrators and so the details are not included in this document. Users can be assigned a company, a rating, and a list of functions, which in combination control the menu options which they are allowed to access.

A user cannot increase his own rating or add functions or companies to his allowed list, nor can he create other users with a higher rating or with companies or functions not on his allowed list. Neither can a user edit the records of another user with a higher rating or in another company, or with functions not on his own list.

Special exceptions to some of these restrictions apply to users with administrator permissions and capabilities.

Menus

Menus can be maintained through the *Configure>System>Menu* option. Since the structure of the menu can affect all users and companies, use of this screen is restricted to the overall system administrator(s) and details are not included in this document.

It is possible for particular menu options to be added or customised for specific locations using the system so that the menu is not the same for everyone. In addition, since the menu will only show those options which the logged in user is permitted to access, it is possible to customise the menu appearance for each individual user, as well as to have the menu customised by company. Thus the same user, if permitted access to the data of more than one location, can see a different menu at each location.

Printers

Printers can be maintained for your company through the *Configure>System>Printers* menu entry. Since this activity is restricted to the overall system administrator(s) the details are not provided in this documentation. Using this function it is possible to add, change or remove printers for any company. Printers are of two basic types.

1. Socket printers make use of IP pipes to transfer short bursts of data direct to the printer, and are ideal for printing barcoded labels and tags.
2. Spooled printers make use of the server print spooling to direct long or large reports to remote printers registered on the server. Only the server administrator(s) can set up a spooled remote printer.
3. Printers designated as lp are locally attached to the parallel port of the client system. This is an experimental interface which is not guaranteed to work or to be maintained for future use.

Though many reports can be printed through your browser's printing services, barcoded labels and certain other reports can only be printed using devices registered on the server. You may need port redirection through your firewall to enable some printing capabilities. Contact your system administrator to set up or reconfigure your printers.

Company Maintenance

Your company details are maintained through *Configure>Application>Company*. Normally only system administrators will have access to this function. Using it you can change your company name, address and short name. The short name appears at the head of the menu. The other information is used for reports and labels. You can register a logo image on the server which will be used for report headings. The image should be full size for the reports as they appear on the screen.

Various other company specific data is maintained that configures the operation of the system for the company in question. The use of a common parent company code for multiple locations permits the joining together of data distributed by location into a single consolidated company report, as well as the use of a single common customer, supplier or item table for all locations of the company.

Chemistry

There is at present no method for maintaining chemistry templates. All companies and suppliers are assigned a standard default template. However the system does provide for and support the use of different templates for each company and also allows for variation in chemistry template by supplier. Expect maintenance for chemistry templates to be added in the future.

Label Format

Barcoded label formats are individual to the label type (Master, Slit, Tube). There is a default label format, but label formats can also be altered to be specific to your company. At present there is no design tool in the system for custom labels. If you wish to use a label design other than the default, please contact your system administrator. Label designs are stored on the server as X...XTTtag.fmt files where X...X is the company code, and TT is the type of label (MC, SC, TB or OL).