# Equipment Tracking in Eclipse for Preventative Maintenance

#### Eclipse Setup

To configure the system, the user must first define the various types of equipment to be tracked for PM in the Equipment Groups form.

Bundler         Bundlers         10000         200000'         200           Cutoffs         Cutoff inserts         10000         200000'         200         Group Code           Los Group         Machines         10000         200000'         200         Description	1115
Cutoffs Cutoff inserts 10000 200000 200 Group Code	
Line Group Machines 10000 2000001 200 Description	
Line Group Machines 10000 20000 200	
Nester 10000 200000 200 Part Count to	PM
Punches Punch Presses 10000 200000 200 Postage to Photoge to Photo	
Roll Tool Mill Rolls 10000 200000 200 Elanod Kun His to Ph	0
RotaryP Rotary Pierce unit 10000 200000 200 Bast Count to	Disposal
UltraSteel UltraSteel Rolls 10000 200000 200 Footbook to	cocal
Uncoiler Uncoilers 10000 200000 200 Bun Hrs to Di	enosal
Elaosed Hrs t	o Disposal
PM Instruction	15
% to First Ale	rt
N C I - I N	+

The level of detail is entirely up to the user. Examples of equipment types include: drywall shear die, drywall punch die, drywall rotary punch die, roll former gearbox, and roll tooling. The important consideration when creating equipment types is that the PM schedule is defined per equipment type, not for each specific piece of equipment. Reporting may be another issue that influences how detailed the user should go in defining equipment types. A PM schedule and lifetime criteria will be required for each equipment type and consist of values for part counts, footage and runtime. Trigger percentages will also be required for the first message and for the last message. The user may also establish a set of PM instructions.

quipment ID	Description	Equipment Group	St Rearder Columns		Date Out Se	ervice	Machine		Initial Date	Equipme
ine 10	Line 10	Line Group	1	1:59 PM	01/11/2007	08:55:06 AM	NONE [	0]	01/10/2007	~
ine 131	Line 131	Line Group	1: Equipment ID	2:00 AM	11 ::	AM	NONE [	0]	01/10/2007	V
ine 158	Line 158	Line Group	11 Description	7:56 AM	01/11/2007	09:36:25 AM	LINE 059	[8]	01/10/2007	V
lotary1	Rotary pierce unit	RotaryP	1 Serial Number	6:49 AM	// ::	AM	LINE 059	[8]	04/16/2007	2
			Date In Service	-						
			Machine							
		1	Initial Date	-					-	
			Set ID							
	-		Last PM Date	-						-
			Current Part Count	-	-				-	-
			Current Run Hrs	1						
_			Lifetime Part Count						1	
Print All	Selected Codes		Lifetime Run Hrs							

Once the equipment types are defined, the user must create the inventory of actual pieces of equipment to be tracked in the Equipment Inventory form. Each copy of a piece of equipment should be assigned a unique ID number. The equipment should be permanently marked with this ID. The user should then estimate and record the appropriate lifetime values to date of part count, footage, runtime, and elapsed time. As the equipment is used in the future, these values will be incremented.

The final required step in configuring the system is to identify in the Equipment Inventory form, the equipment currently in service for each machine.

∆ eboO	Maintenance Reason		Mach. Group	Responsibility Type
1	Regular PM			Operational
2	Breakdown			Equipment
3	Malfunction			Operational -
				1 2
	(			
_			-	
-				
-		rë.		
Print All	C Selected Codes			

An optional step in configuring the system is to identify in the Maintenance Reason Codes form, the codes and their meanings to use in specifying why a piece of equipment is taken out of service, and the activity responsible for the action.

#### Eclipse-COMM Processing of Production Data

When "Collect production data for PM tracking" is turned on, values from the production data returned from the controller will update the inventory record for all equipment shown as "In Service" for the machine.

pdates General Display Communications	Import/Export I Timing Backup/Restore Shift Time
Tables Reports	Controllers DXF Files
<ul> <li>Carry last delay forward to end of shift</li> <li>Scheduled Downtime Delay Code: 92</li> <li>Verify coils when loaded         <ul> <li>Disable coil OK to run message</li> <li>Log production errors</li> <li>Collect production data for reports</li> <li>Collect measurement data for reports</li> <li>Collect coil data for reports</li> <li>Collect production data for PM tracking</li> </ul> </li> </ul>	<ul> <li>Reschedule orders after memory clear</li> <li>Do not show controller messages</li> <li>Enable hole counting</li> <li>Print coil label on coil unload</li> <li>Label Name:</li> <li>Reconcile coil length when complete</li> <li>End of Coil Scrap Code:</li> </ul>
Always create new pattern numbers     XL Restricted     Pattern Range:     0 - 0      Allow Part Numbers w/ no part/punches     Pattern for print only parts     0	Enable Send Lists: Employee Numbers Scrap Codes Delay Codes

The quantity values in the production data will be used to update the part count values. Instances of manual shears with no quantity will also update the part count. The footage value in production data will be used to update the footage values. The runtime value in production data will be used to update the runtime values. Both the current and the lifetime values will be updated.

As the part count, footage and runtime values are updated in the equipment inventory, the current and lifetime values will be compared to the current and lifetime PM trigger settings for the associated group the equipment ID is assigned to. Depending on the message timing parameters for the group, the initial warning message will be sent based on the values reaching the indicated percent of the PM trigger values. Interval messages will be sent as the values exceed the initial message percent by increments of the message interval percent. The final message will be sent as the values exceed the final message percent after which no more messages will be sent for that equipment ID. Information pertaining to when messages have been sent will be updated to the equipment inventory.

## Equipment Changes Out - In

When a piece of equipment being tracked is removed from a machine and replaced with another copy of the equipment, Eclipse must be updated. This can be accomplished at the XL controllers using Query Lists. It can also be accomplished in Eclipse with the Equipment Inventory form.

The following figure shows the entries required to support PM equipment tracking from the XL200 controllers with a UART version 3.15 or greater. More detail is provided later in the PM Query List setup section.

Items 15, 20, 25, 30, and 35, are set up to be PERMANENT query lists which means they will reside in the XL controller's REQUEST ECLIPSE DATA section of the PRODUCTION MENU (Production Data button).

Query Lists			
Outline View (1)		Item Detail (2)	
<ul> <li>(15) Place Equipment In Service</li> <li>(20) Remove Equipment from Service</li> <li>(25) Equipment Due for Removal</li> <li>(30) Add Equipment to Set</li> <li>(35) Remove Equipment from Set</li> <li>(40) Equipment not in Sets</li> <li>(45) Equipment in Sets</li> <li>(50) Groups for Equipment</li> <li>(55) Equipment not in Service</li> </ul>			
Print New Item Delete	Send List	Save Revent	Close

Selection of the "Remove Equipment from Service (20)" query list in the XL controller will trigger Eclipse-COMM to provide a list of equipment currently in service on the machine from the equipment inventory. Each line will include a checkbox for selecting the equipment to process. You can select one or more equipment ID's for processing.

In Eclipse-COMM, the equipment ID will be located in the equipment inventory and the out of service for PM time stamp will be updated. A combined image of the equipment inventory for

the equipment ID and its associated equipment group data will be placed in a history file. Then the machine number and the current values for part counts, footage, and runtime will be set to zero.

Selection of the "Place Equipment in Service (15)" query list in the XL controller will trigger Eclipse-COMM to provide a list of available equipment groups. The equipment group that includes the piece of equipment to be placed in service should be selected. This will trigger Eclipse-COMM, to provide a list of the equipment ID's for the selected equipment group that are not already in service at a machine. The equipment ID being placed in service should be selected from this list. In Eclipse-COMM, the equipment ID will be located in the equipment inventory and the machine number and the in service for PM time stamp will be updated. Then the current values for part count, footage and runtime will be set to zero.

### Deleting Equipment IDs

Equipment can only be removed from the equipment inventory using the Equipment Inventory form. When a piece of equipment is removed from the inventory, a combined image of the inventory record for the equipment ID and its associated equipment group record is placed in a history file.

#### Graphical PM Status

Edit	: Orders Parts Controller	Reports Inv	entory Mainter	nance Equipment	PM System To	ols Window I	Help			
	<i>~</i> ]•					START	ECLIPSE-CO	MM		
2(	lips	<b>2</b> <sup>m</sup>								
īs	Machine A	SnapShot @	Order	Material	Prod. Code	PM Status	Model	Version	UART	Coil Numb
0.0	BIG SHEAR [14]					m	XL100A Dietric	7.24	2.08	
0.0	KATZ [ 15]		3 5/8KASL2	358KASL	KASL	000	XL100A Dietric	7.16	2.04	
0	LINE 002 [ 9]		3 5/8USTE	P200623US	USTE	00	XL200DLP	3.13.00	3.15	0892643
0	LINE 003 [ 5]		7/8 FCN25	78FCN	FCN	00	XL100A Dietric	7.24	2.08	0413213
	LINE 004 [ 7]		7/8 FCE20	P200311	FCE	0	XL200DLP	3.09.02	3.13	0891755
	LINE 007 [ 4]		3 5/8USTN	P250623US	USTN	000	XL200DLP	3.27.00	3.22	0893081
	LINE 012 [ 1]		4 USTE2	P200647US	USTE	0	XL200DLP	3.13.00	3.15	3032914
0	LINE 014 [12]		4 CSJ318	P1807373G40	CSJ3	00	XL200DLP	3.19.00	3.18	3032645
	LINE 054 [ 6]		2 CAE206	P200378	CAE	0	XL200DLP	3.20.00	3.20	3032802
0	LINE 059 [ 8]		2 1/8HRN1	P240416	HRN1	00	XL200DLP	3.13.00	3.15	0412617
	LINE 060 [ 2]		4 TSB186	P1806313G40	TSB	00	XL200CLDLP	3 15.01	3.15	3032930
	LINE 080 [ 3]		2 1/2CSJ51	P1606055G40	CSJ5	00	XL200DLP	3.09.02	3.13	3032912
	LINE 095 [11]		1 1/2CHN2	P1602055G40	CHN2	00	XL200DLP	3.13.00	3.15	0891274
	LINE 101 [13]		1 1/4CBUN	P2802716	CBU	$\square$	XL200DLP	3.09.02	3.13	3032050
0.0	PRESS BRAKE [16]	-	1 1/4CBUN	P2802716	CBU		XL100A	7.16	2.04	3018811
_										
t Da t: ft Fo	ate 02/08/2008 1 potage 1200	Machine Order Material	[ 1] L 4 U P2006	LINE 012 STE206190 647US		Model Version Coil Num	XL20 3.13.0 ber 30329	0DLP 00 9147		

A graphical representation of a roller in a roll forming machine is displayed in the PM Status column of the main Eclipse form. The color of this picture represents the status of equipment in the equipment inventory that is designated in service at the indicated XL controller.

White	No in service equipment due PM
Yellow	First warning, some in-service equipment due PM
Red	Last warning, some in-service equipment due PM
Red with "D"	Some in-service equipment due disposal

#### Reports

Equipment ID         Group Code         Equip Set         Set ID         Date In Service         Machine         Date Out Servic Date Last Mainten         Due PM         Due Dispd:                • Line 10         Line Group              · Line 10         01/10/2007         NONE [ 0]         01/11/2007         01/12/2007              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I              · I               · I              · I              · I               · I			Equipmen	ıt ( <u>1</u> )			Filter (2)					
Line 10         Line 10         01/10/2007         NONE [0]         01/11/2007         01/12/2007           Line 131         Line Group         V         Line 131         01/11/2007         NONE [0]         / /         / /         /           Line 158         Line Group         V         Line 158         01/11/2007         Line 158         01/11/2007         / /         /         /         //         //         //         //         //         //         /         //	Equipment ID	Group Code	Equip Set	Set ID	Date In Service	Machine	Date Out Serv	ic Date Last Mair	ten Due PM	Due Dispo*		
Line 131       Line 131       01/11/2007       NONE [ 0]       / /       / /       I         Line 158       Line 158       01/11/2007       Line 059 [ 8]       01/11/2007       / /       V       I         Rotary1       Rotary2       V       Rotary1       04/18/2007       Line 059 [ 8]       / /       04/16/2007       V       I         Rotary1       Rotary1       04/18/2007       Line 059 [ 8]       / /       04/16/2007       V       I       I         Image: State of the state of	Line 10	Line Group	~	Line 10	01/10/2007	NONE [ 0]	01/11/2007	01/12/2007	F	-		
Line 158       Line 158       01/11/2007       LINE 059 [8]       01/11/2007       / /       Image: Control of the second secon	Line 131	Line Group	~	Line 131	01/11/2007	NONE [ 0]	11	11	E			
Rotary1         Rotary1         04/18/2007         LINE 059 [8]         / /         04/16/2007         Image: Control of the second sec	Line 158	Line Group	~	Line 158	01/11/2007	LINE 059 [ 8]	01/11/2007	11	2	C .		
Image: Constraint of the second se	Rotary1	RotaryP	4	Rotary1	04/18/2007	LINE 059 [ 8]	11	04/16/2007	V			
ter: NO FILTER  quence: (3)  Descending  QUIPMENT ID  I I I I I I I I I I I I I I I I I I		<u> </u>										
ter: NO FILTER		-	<u> </u>									
EQUIPMENT ID	TID IN T											
DUE MAINTENANCE DUE DISPOSAL AVAILABLE PEPEORMANCE	ilter: NO FILTE aquence: ( <u>3</u> )	R	ıg				Report:	Print All	○ Selected E	Equipment		
DUE DISPOSAL AVAILABLE DERECOMMINGE	Iter: NO FILTE equence: (3) QUIPMENT ID	R	ig •				Report: DUE MA	Print All  INTENANCE CE	C Selected E	Equipment		
AVAILABLE	ter: NO FILTE quence: (3) QUIPMENT ID	R	19 •				Report: DUE MA	Print All  INTENANCE  CE  NTENANCE	C Selected E	Equipment		
PEPEOPMANCE	ter: NO FILTE quence: (3) QUIPMENT ID	R	ng •				Report:	Print All  INTENANCE  CE  NTENANCE  POSAL	C Selected E	Equipment		
JPERFORMANCE.	ilter: NO FILTE equence: (3) EQUIPMENT ID	ER	9 •	×			Report: DUE MA IN SERVI DUE MA DUE DIS AVAILAB	Print All  INTENANCE  CE  NTENANCE  POSAL LE	C Selected E	Equipment		

There are several reports available to support Preventative Maintenance activities. You can see the selection in the figure above.

### PM Query List setup

Query Lists				
Outline View (1)		Item Detai	I ( <u>2</u> )	
<ul> <li>(15) Place Equipment In Service</li> <li>(20) Remove Equipment from Service</li> <li>(25) Equipment Due for Removal</li> <li>(30) Add Equipment to Set</li> <li>(35) Remove Equipment from Set</li> <li>(40) Equipment not in Sets</li> <li>(45) Equipment in Sets</li> <li>(50) Groups for Equipment</li> <li>(55) Equipment not in Service</li> </ul>				
Print New Item Delete	Send List	Save	Revert	Close

The above screen sample shows the entries required to support PM equipment tracking from the XL200 controllers with a UART version 3.15 or greater.



The entry shown in this screen sample is set up to be a PERMANENT query list which means it will reside in the XL controller's REQUEST ECLIPSE DATA section of the PRODUCTION MENU (Production Data button) once it has been assigned to a machine (check the "This List" box) and sent to the controller (Send List button). You must save (Save button) any pending changes before sending the list setup data to the controller.

When this entry is selected from the entries available at the controller and Eclipse-COMM gets the request, it will respond with a list of equipment groups. Only one equipment group may be selected for further processing.

Once the equipment group request is received, Eclipse-COMM will respond with the list defined in item 055 (see Next List above). Item 55 in this example generates a list of equipment ID's assigned to the selected equipment group that are not currently in service (have no machine number assigned).



The entry shown in this screen sample is also set up to be a PERMANENT query list which means it will reside in the XL controller's REQUEST ECLIPSE DATA section of the PRODUCTION MENU (Production Data button) once it has been assigned to a machine (check the "This List" box) and sent to the controller (Send List button). You must save (Save button) any pending changes before sending the list setup data to the controller.

When this entry is selected from the entries available at the controller and Eclipse-COMM gets the request, it will respond with a list of equipment ID's, their description, group and set ID if applicable, for equipment that is currently in service at the XL controller. Each line will include a checkbox for selecting the equipment ID(s) to process. You can select one or more equipment ID's for further processing.

In Eclipse-COMM, the equipment ID will be located in the equipment inventory and the out of service for PM time stamp will be updated. A combined image of the equipment inventory for the equipment ID and its associated equipment group data will be placed in a history file. Then the machine number and the current values for part counts, footage and runtime will be set to zero.



The entry shown in this screen sample is also set up to be a PERMANENT query list which means it will reside in the XL controller's REQUEST ECLIPSE DATA section of the PRODUCTION MENU (Production Data button) once it has been assigned to a machine (check the "This List" box) and sent to the controller (Send List button). You must save (Save button) any pending changes before sending the list setup data to the controller.

When this entry is selected from the entries available at the controller and Eclipse-COMM gets the request, it will respond with a list of equipment ID's, their description, group and set ID if applicable, for equipment that is currently in service at the XL controller and a PM due message has been sent to the controller (result of one or more of the elements tracked exceeding the limits for the associated equipment group). Each line will include a checkbox for selecting the equipment ID(s) to process. You can select one or more equipment ID's for further processing.

In Eclipse-COMM, the equipment ID will be located in the equipment inventory and the out of service for PM time stamp will be updated. A combined image of the equipment inventory for the equipment ID and its associated equipment group data will be placed in a history file. Then the machine number and the current values for part counts, footage and runtime will be set to zero.



Sets provide a means of managing multiple pieces of equipment as a single unit.

The entry shown in this screen sample is also set up to be a PERMANENT query list which means it will reside in the XL controller's REQUEST ECLIPSE DATA section of the PRODUCTION MENU (Production Data button) once it has been assigned to a machine (check the "This List" box) and sent to the controller (Send List button). You must save (Save button) any pending changes before sending the list setup data to the controller.

When this entry is selected from the entries available at the controller and Eclipse-COMM gets the request, it will respond with a list of equipment set ID's, their description, group and set ID if applicable that have been defined in the Equipment Inventory form and are designated in service at the XL controller or not in service at any other XL controller. Only one equipment set may be selected for further processing.

Once the equipment set request is received, the equipment set ID will be saved and Eclipse-COMM will respond with the list defined in item 050 (see Next List above). Item 50 in this example generates a list of equipment groups that is used to select equipment ID's to be assigned to the saved equipment set ID.



The entry shown in this screen sample is also set up to be a PERMANENT query list which means it will reside in the XL controller's REQUEST ECLIPSE DATA section of the PRODUCTION MENU (Production Data button) once it has been assigned to a machine (check the "This List" box) and sent to the controller (Send List button). You must save (Save button) any pending changes before sending the list setup data to the controller.

When this entry is selected from the entries available at the controller and Eclipse-COMM gets the request, it will respond with a list of equipment set ID's, their description, group and set ID if applicable, that have been defined in the Equipment Inventory form that are designated in service at the XL controller or not in service at any other XL controller. Only one equipment set may be selected for further processing

Once the equipment set request is received, Eclipse-COMM will respond with the list defined in item 045 (see Next List above). Item 45 in this example generates a list of equipment ID's assigned to the selected equipment set ID.



When Eclipse-COMM gets a request that references this item in its "Next List", it will respond with a list of equipment ID's, their description, group and set ID if applicable, that belong to the equipment group from the request and that are not in service and not already assigned to a set.

In the XL controller, the results of this query will appear in a list of equipment ID's. Each line will include a checkbox for selecting the equipment ID(s) to process. You can select one or more equipment ID's for further processing.

Once the equipment ID's request is received, Eclipse-COMM will respond by assigning the saved equipment set ID (see item 50) to the equipment inventory records for the selected equipment ID's as no "Next List" is indicated.



When Eclipse-COMM gets a request that references this item in its "Next List", it will respond with a list of equipment ID's, their description, group and set ID if applicable, that belong to the equipment set ID from the request and that are not in service and not a set master record.

In the XL controller, the results of this query will appear in a list of equipment ID's. Each line will include a checkbox for selecting the equipment ID(s) to process. You can select one or more equipment ID's for further processing.

Once the equipment ID's request is received, Eclipse-COMM will respond by removing the equipment set ID from the equipment inventory records for the selected equipment ID's as no "Next List" is indicated.



When Eclipse-COMM gets a request that references this item in its "Next List", it will respond with a list of equipment groups.

In the XL controller, the results of this query will appear in a list of available equipment groups. Only one equipment group may be selected for further processing.

Once the equipment groups request is received, Eclipse-COMM will respond with the list defined in item 040 (see Next List above). Item 40 in this example generates a list of equipment ID's that is used to select equipment ID's to be assigned to the saved equipment set ID (see item 30).



When Eclipse-COMM gets a request that references this item in its "Next List", it will respond with a list of equipment ID's for equipment that is not designated in service.

In the XL controller, the results of this query will appear in a list of available equipment ID's. Each line will include a checkbox for selecting the equipment ID(s) to process. You can select one or more equipment ID's for further processing.

In Eclipse-COMM, the equipment ID will be located in the equipment inventory and the in service time stamp will be updated.