



Pegasus PC Framer
Control System

User guide

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1 Introduction

The computerised Control System fitted to this machine has been designed and manufactured by *Pegasus Designs Pty Ltd, 10/176 Redland Bay Road, Capalaba.*

The system is preconfigured to suit any Roll forming machine configuration. The Pegasus PC Framer is capable to run manually entered pieces. Library components or Custom data files. For a Steel Framing System is normal to import .CSV files, .CNC files or .Partslist files.

2 System Overview

The Pegasus PC Framer uses standard Windows 7 Computer Control System that connects via USB or Parallel port to our Custom Built Interface System installed in the Electrical Cabinets.

The HMI used is an off the shelf Touch Screen and can be replaced by any make or model of monitor.

Recommended System Requirements

- Intel I3 or equivalent
- Windows 7 (clean installation)
- 4GB RAM or greater
- 200MB free disk space or more
- SVGA display, 1024x768 or higher
- CD-ROM drive or USB Storage Device
- Mouse or other pointing device

Alternatively Pegasus Designs can supply a computer installed and fully tested for the Controller Software.

Relevant Machine control information is displayed on the monitor and the machine may be controlled generally from the on screen buttons via the touch screen or mouse or via industrial push buttons. The computer controls the Pegasus Designs Input/Output System via the parallel printer port or USB port.

The I/O System is fitted with LED indicators on all input and outputs. Inputs may be monitored and outputs may be switched in the diagnostics section of the program.

3 Operating Procedure

3.1 Getting Started

Before the machine can be operated, the power must be fully connected. Check the machine Manual to ensure the operator has knowledge of the interlocking system and the ability to Enable or Reset the Machine.

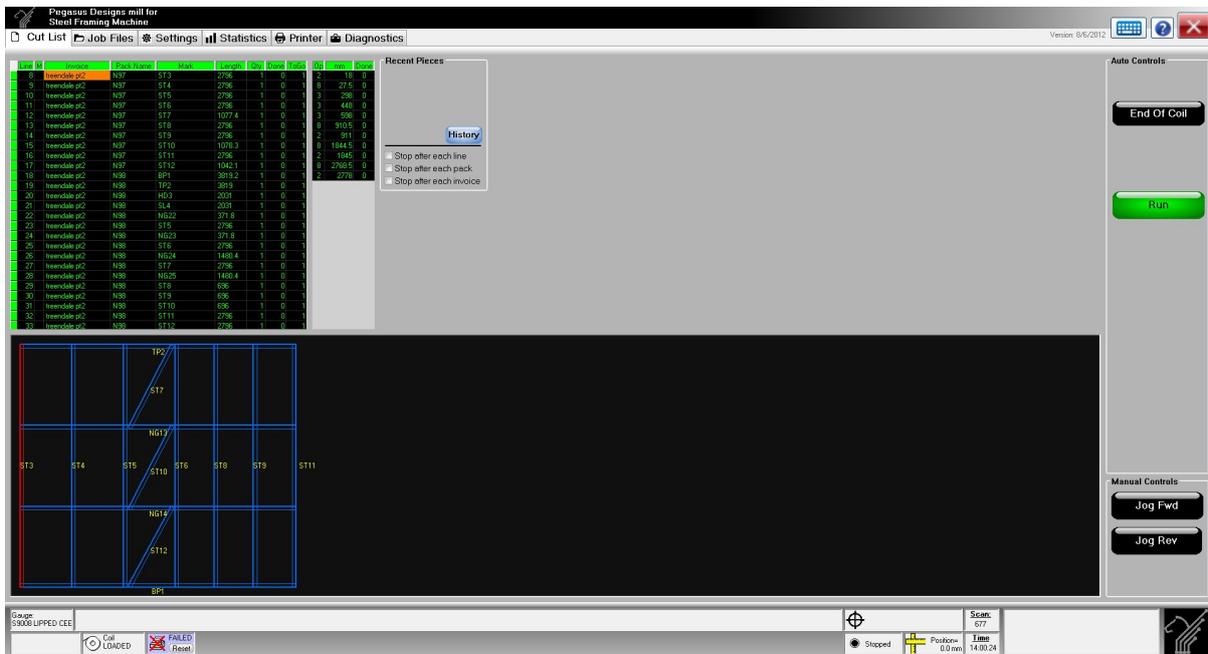


Figure 1 - Cutting List Page

3.1.1 Interlocks

If the machine **ready** light does not illuminate when the reset button is pressed there is an interlock that is not correctly set.

To close the interlocks circuit all emergency stop switches must be released and the Guard Switches must be closed.

Before any part of a job can be run, the Emergency stop circuit must first be ready. The status of this can be seen by **ESR reset/ready** light on the console as well as the absence of the following warning message on the status bar of the CONTROLLER SOFTWARE.



Figure 2 - ESR warning in Status Bar

When the Emergency stop circuit is reset, ensure that all guards on the machine are closed and press the start button on the console to begin running the first piece on

the cutting list. **If the guards are not closed the machine will not run.** The message “Check ESR/Interlocks” and a dialog box displaying the message “**drive stalled**”.

3.1.2 Loading a Job

This procedure outlines how to load a job from a file.

- Check that the gauge which is selected corresponds to the gauge of material which is loaded into the machine. Note that the computer will select only items of that gauge from the file.
- Select the “Job Files” tab in the Pegasus PC Framer SOFTWARE.
- Change the working directory to the directory containing the job to be run by
 - Left mouse clicking on the change directory button.
 - Use the drop down menu that appears to select the appropriate drive
 - Navigate to the sub-directory where the job file is located.
 - Any directory can be changed to be the default directory by clicking on the “**Set as Default Directory**” button.
 - If there are job files in a directory they will appear in the job list in the centre of the Pegasus PC Framer software window.
- Select the desired job from the list and left mouse click on load file.
- If the file contains pieces of the selected gauge type then they will be loaded into the cutting list.
- The number of pieces matching the selected gauge type is displayed in the message area of the “Load Status” screen, (the message area is the grey embossed area towards the bottom of the screen).

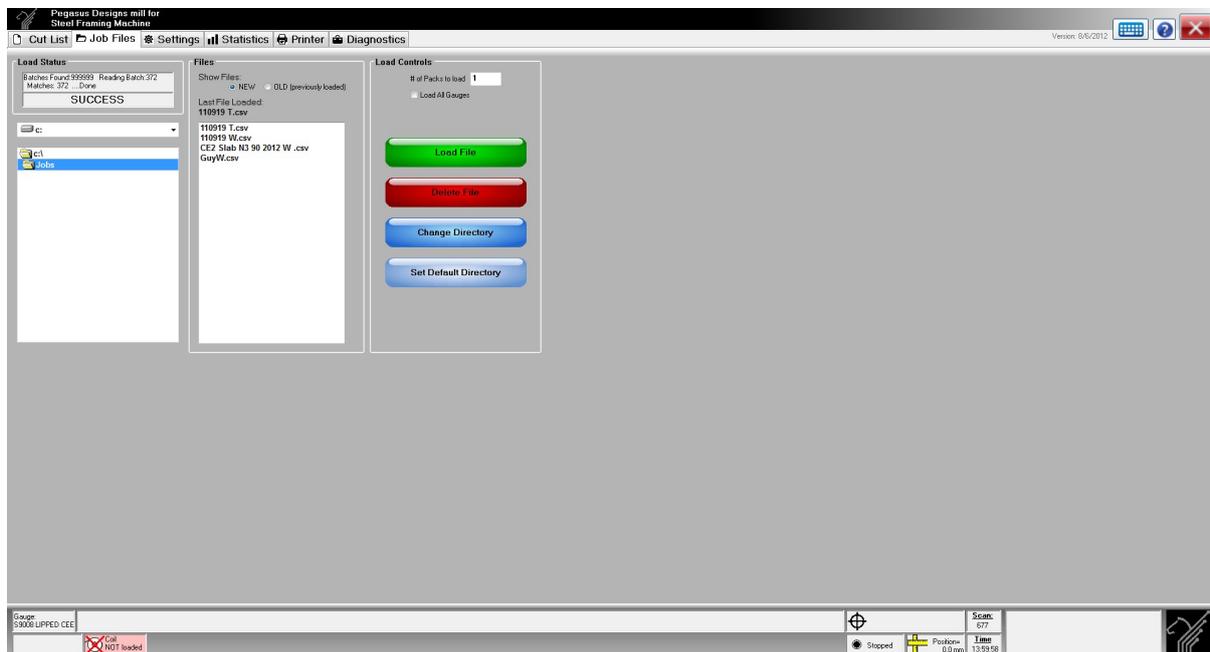


Figure 3 – Job Files Page

NB: If a job contains multiple gauges only those pieces in the job that correspond to the selected gauge will be run. Once they have been completed, follow the procedure for changing the gauge and load the file again for the next gauge.

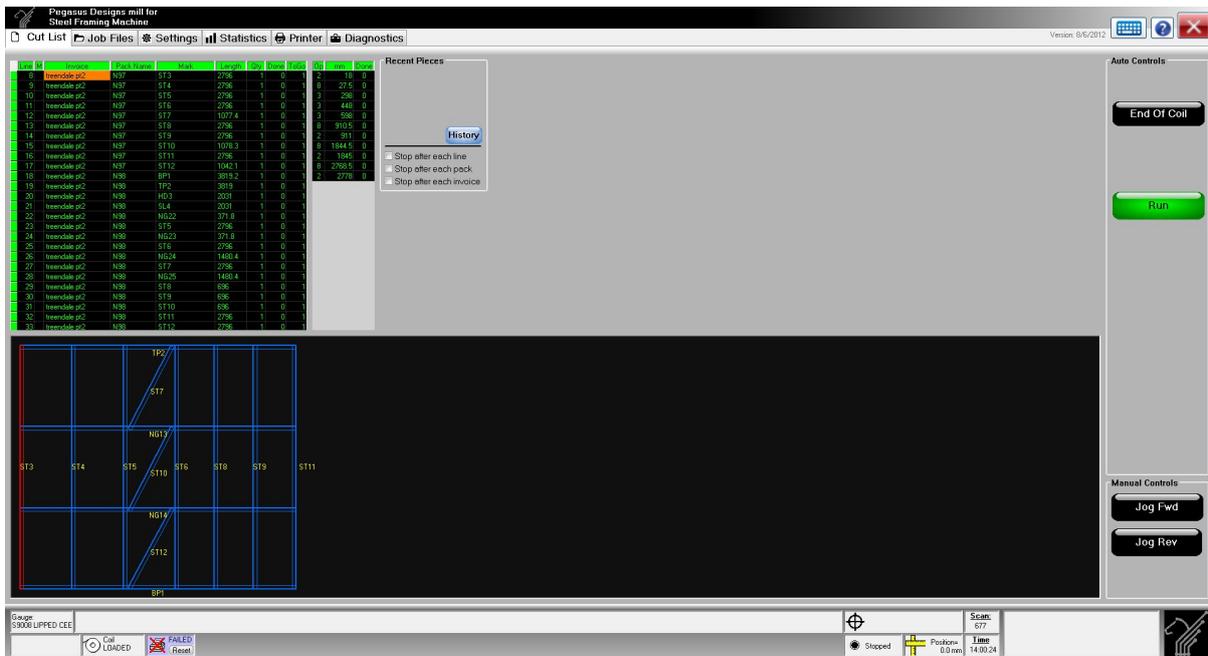


Figure 4 - Job Files Loaded

3.1.3 Changing Gauge

To change the current gauge

- Ensure the cutting list is empty (it will only be possible to change gauge if the cut list is empty)

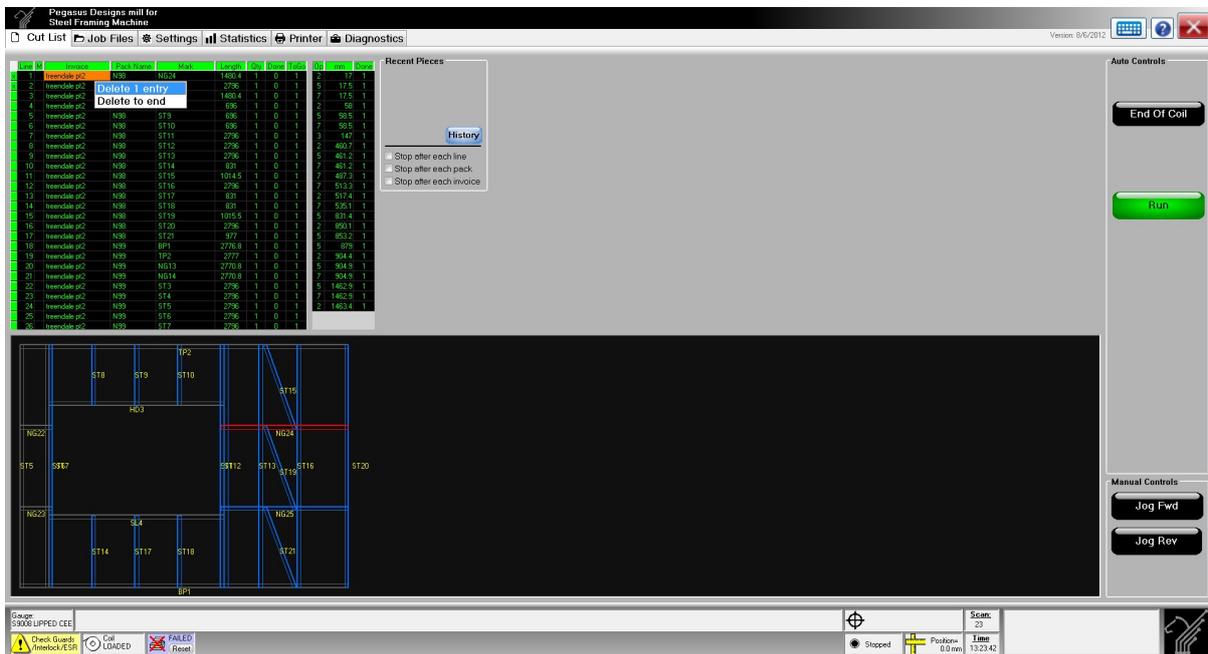


Figure 5 – Deleting Cutlist

- Left mouse click on **“GAUGE”** in the status bar of the Pegasus PC Framer software

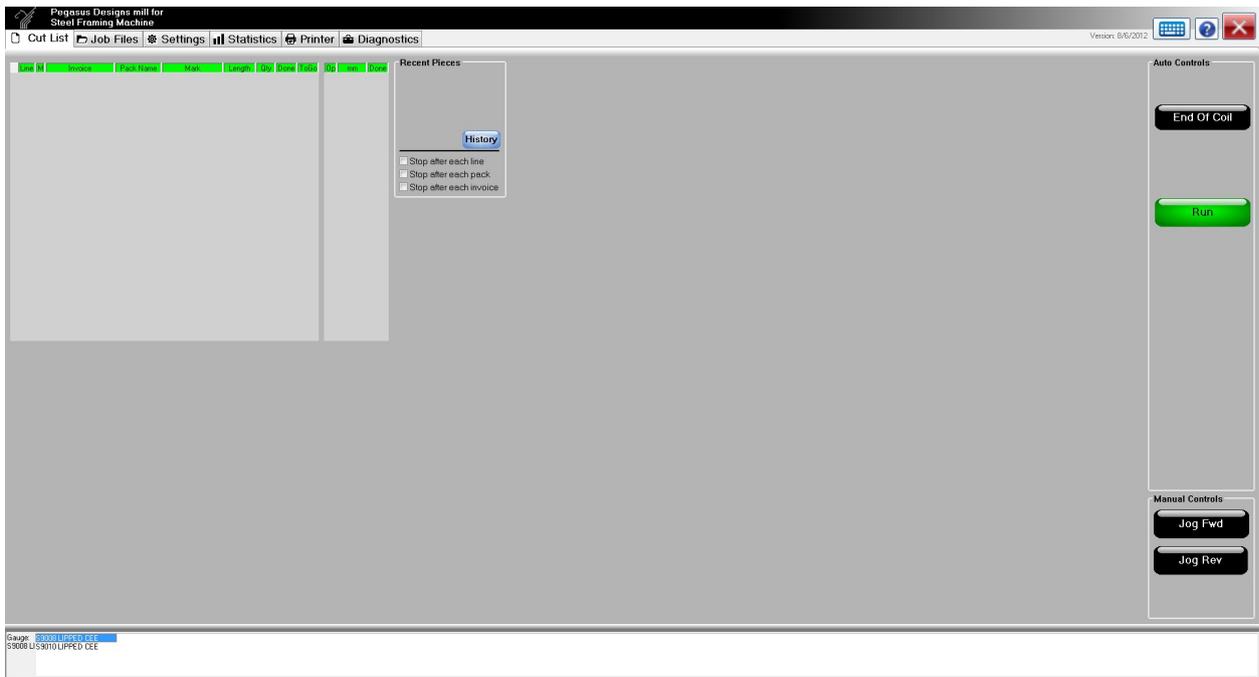


Figure 6 - Changing Gauge

- Select the new gauge

NB: if the desired gauge is not available, follow the directions to add a new gauge.

3.1.4 Adding/Removing Gauge

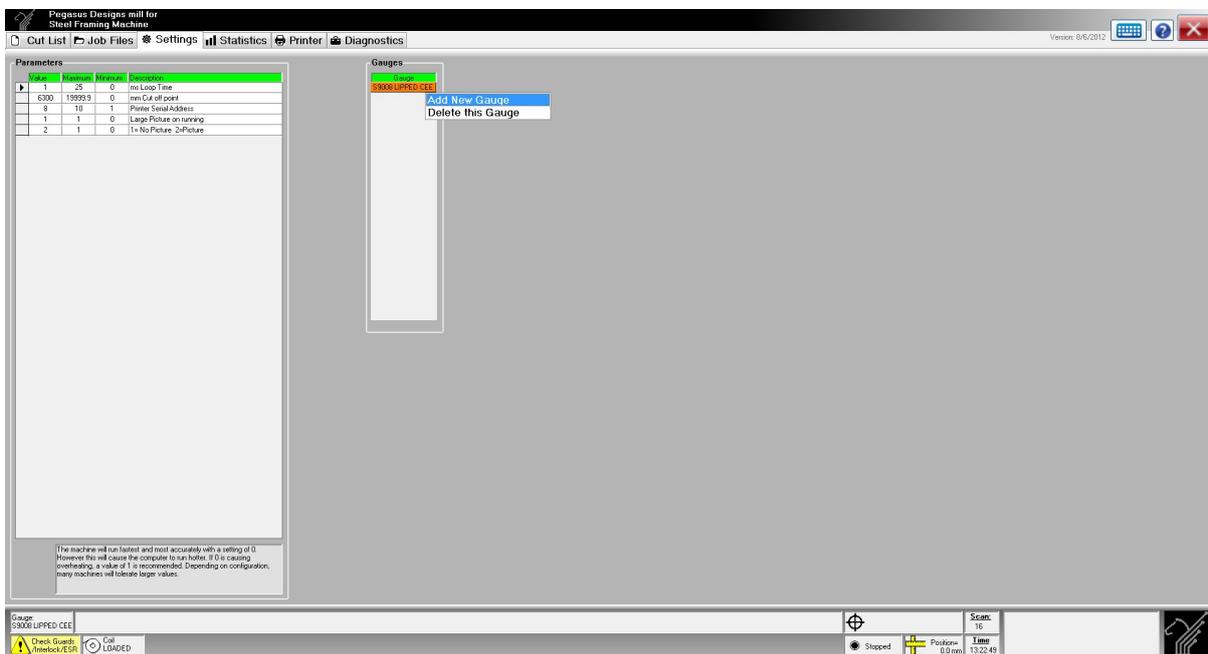


Figure 7 - Adding/Removing Gauges

To add a new gauge or remove an existing gauge from the list of available gauges

- Select the **Settings** screen by “left clicking” the tab marked **Settings**.
- Right mouse click below the Gauge heading in the List of Gauges section of the window. If you wish to delete a gauge right mouse click on that gauge in the list.
- Select the desired option from the menu that appears

- If adding a new gauge enter the name of the gauge.
- Note that this name will need to **correspond precisely** with the gauge description of a part in the data file.

3.1.5 Manually inserting a piece

To manually insert a piece to be run, ensure that the cutting list tab is selected, right mouse click underneath the headings of the cutting list, then select the **insert new job** option. If there are existing pieces in the cutting list, making this selection by right mouse clicking on a piece in the cutting list will insert the new piece below that piece.

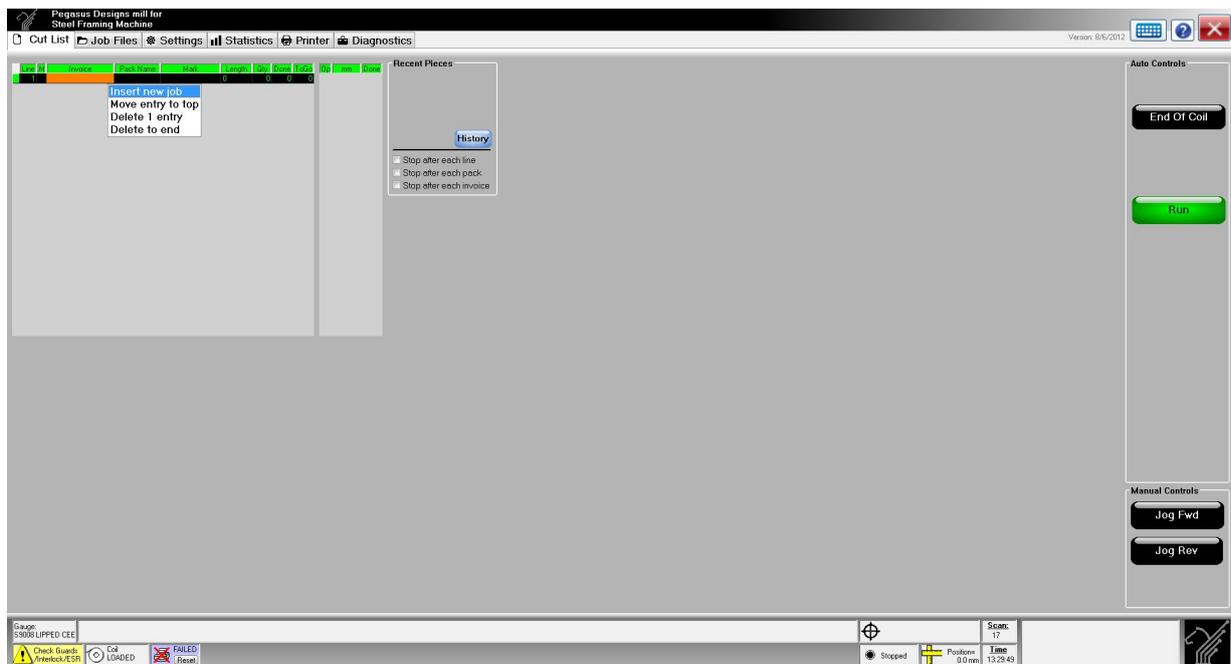


Figure 8 - Manually Inserting a Job

3.1.6 Editing the Cutting List

Pieces can be loaded into the cutting list via either of the two methods specified above. It is not possible to edit any of the details of pieces in the cutting list that were entered from a file. The only change which can be made is to the “quantity”. That is to say, if a piece has been loaded into the cutting list from a file, the operations performed and the locations on the piece cannot be manually edited by the machine operator from within the Pegasus PC Framer software.

Punching and cutting details of items can be entered manually by following the procedure outlined below:

- Ensure that the cutting list tab has been selected
- Enter the quantity and length of the item. (Enable the on screen keyboard.)
- Highlight the piece you wish to add or delete operations to. (This cannot be an item which was loaded from a file).
- Right mouse click on the right hand side of the window below the following figure.

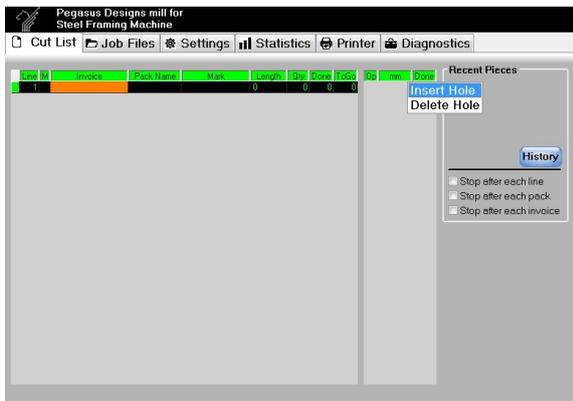


Figure 9 - Edit Operations for Current Piece

- Select insert hole to add an operation to the piece selected in the cutting list.
- Highlight the position corresponding to the op code.

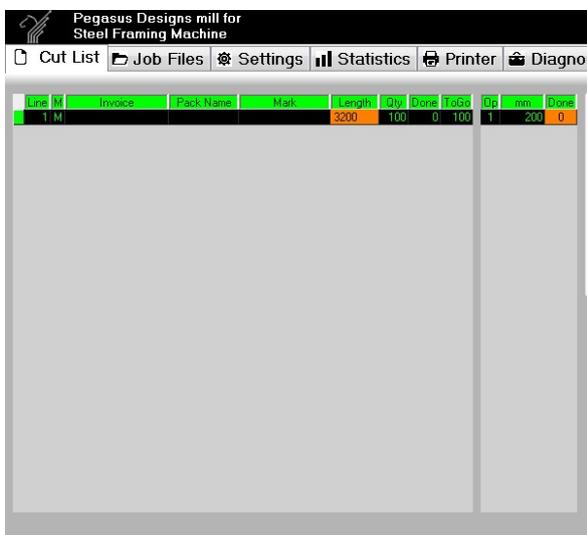


Figure 10 - Select Op-code

- Use the keyboard to insert the desired op code. For a list of op codes refer to Diagnostics Tab- Shear/Punches.
- Then highlight the mm column of the new op code and again use the on screen keyboard to enter the position of the operation from the start of the piece (Leading Edge). (For most operations the position of the operation refers to the centre point of that operation.).

3.1.7 Running a Job

3.1.7.1 First Job

Once a job is loaded into the cutting list, the operator can begin the job by firstly selecting the **Cut List** tab. Select the **Start of coil** button on the **Cut List** screen. This will operate one cycle of the shear and set the starting point of the first piece in the cutting list.

If the first piece to be produced has operations closer to the front edge than the machine is permitted to reverse then a dialog box will appear when the **Start** button is pressed displaying the message **Can't Reverse that Far**.

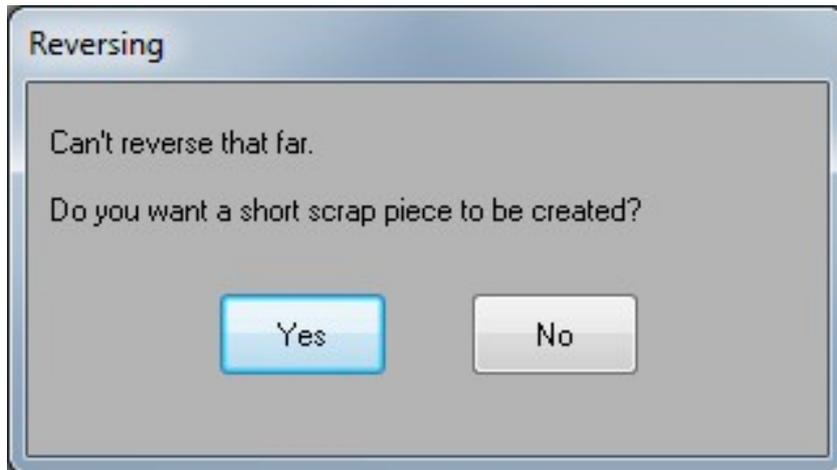


Figure 11 – Start of Coil, Can't Reverse That Far Warning

By selecting 'Yes' a scrap piece will automatically be entered at the top of the cutlist, the length of this can be varied by a parameter in the settings tab, 'Length of Scrap Piece'. If you produce a stock length it is useful insert this length in here.

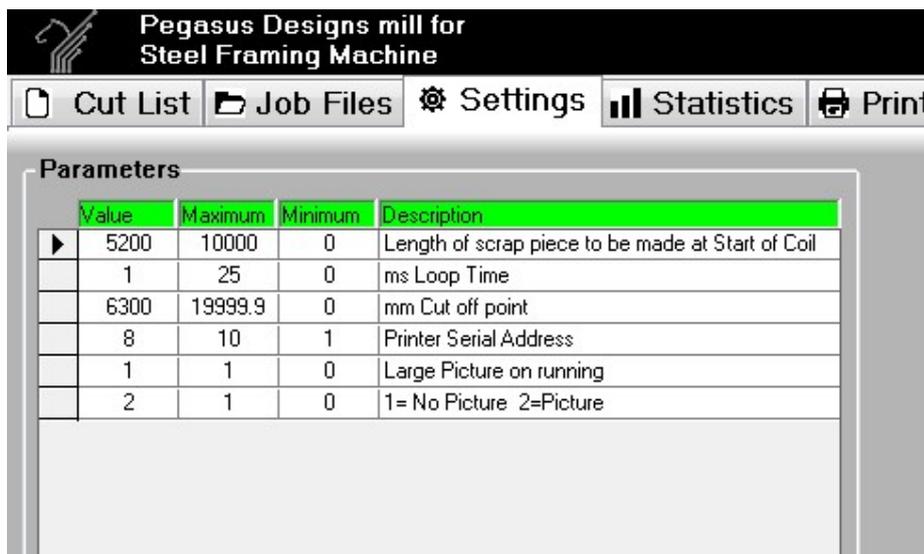


Figure 12 – Settings Tab

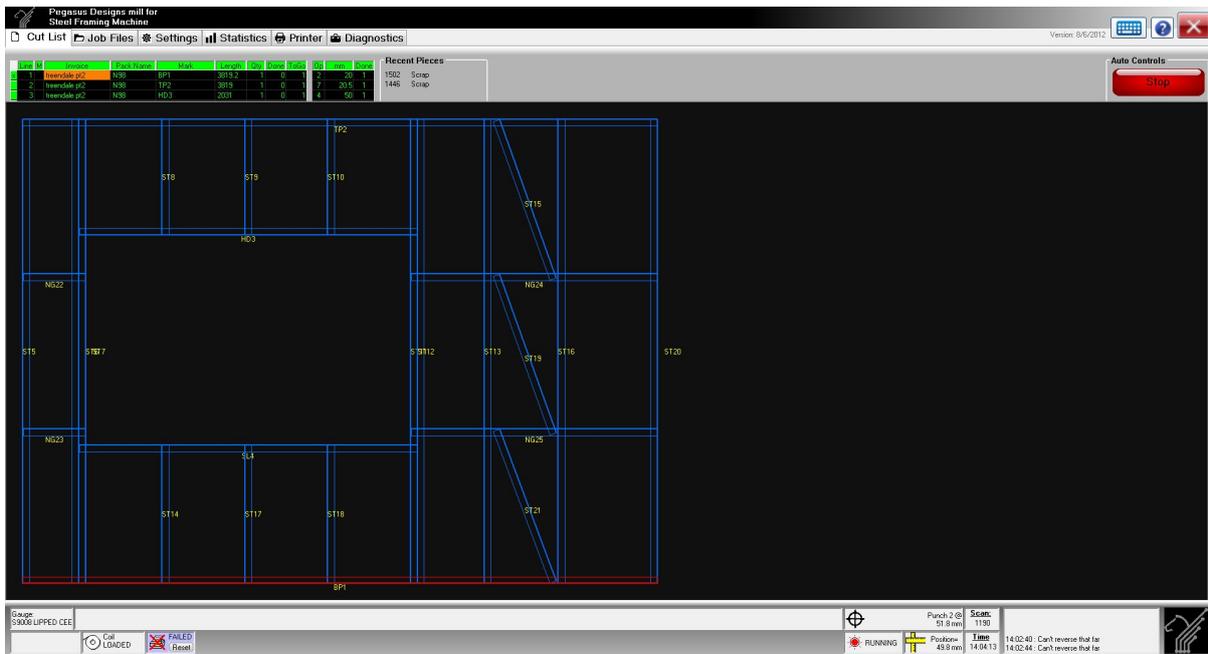


Figure 13 – Auto Running Screen

3.1.7.2 First Job

While the machine is running a frame/truss that is being produced will be displayed how it is assembled. The piece in red is the piece the machine is currently producing, any pieces that are grey have been produced and the pieces in blue are yet to be produced.

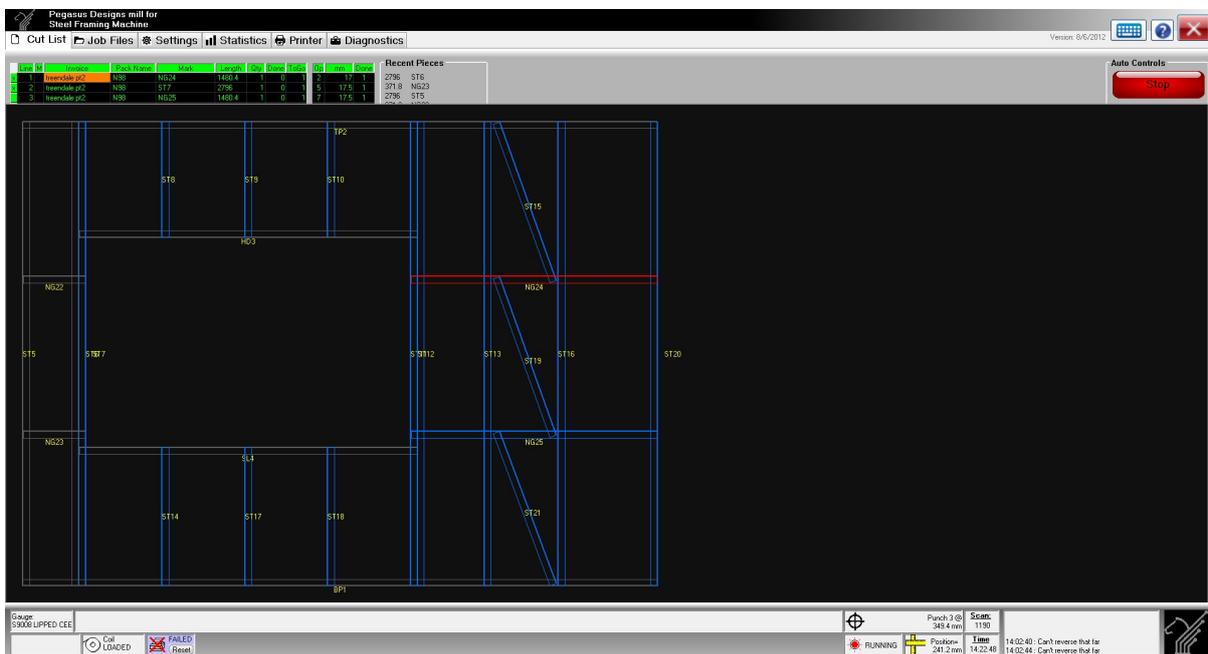


Figure 14 – Auto Running Screen-Pieces Made

3.1.7.3 End of Coil Warning

The machine will be stopped and the operator will be advised to enter more jobs or do an end of coil when the length of material in the cutting list is equal to the amount specified as the **mm to Cut Off** parameter. This feature prevents excess wastage by allowing minimal wastage at changes of coil as well as allowing the operator to add to the cutting list so that there is no wastage between jobs.

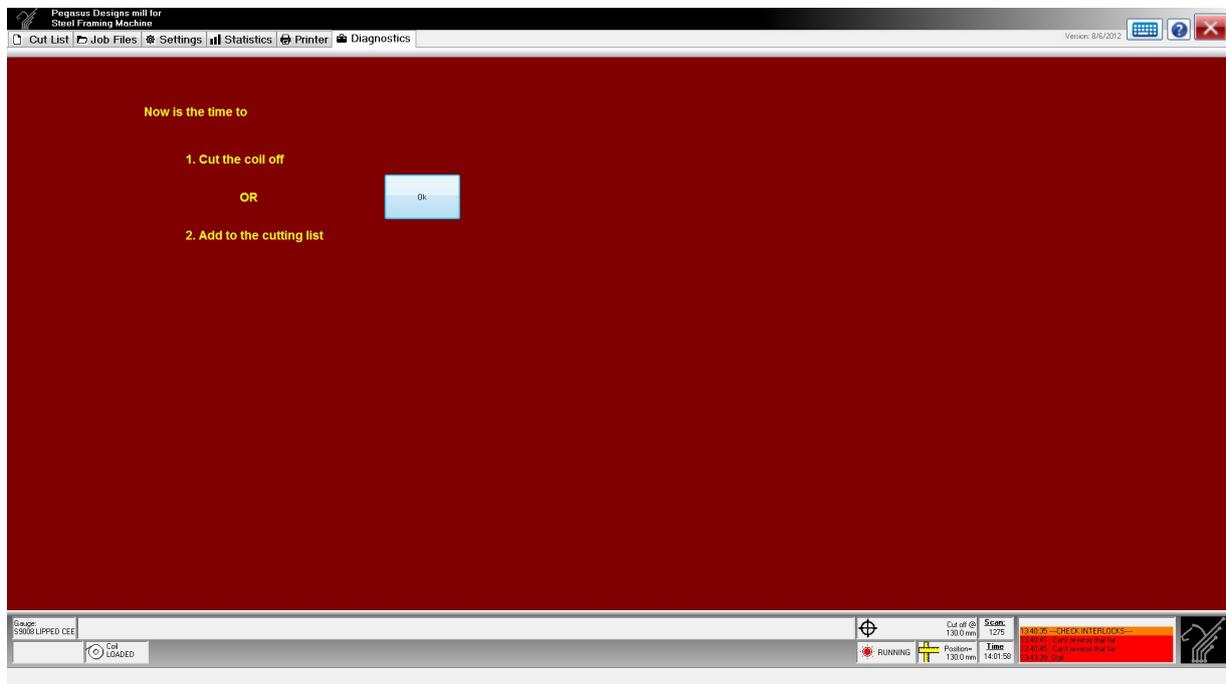


Figure 15 – Coil Cut-off Warning

3.1.7.4 History and Remaking Pieces

The History button available when the machine is not running allows operators to simply remake pieces, Packs, walls or jobs without the need to find and reload the original job file. The History logs 10MB of data which will date back many months.

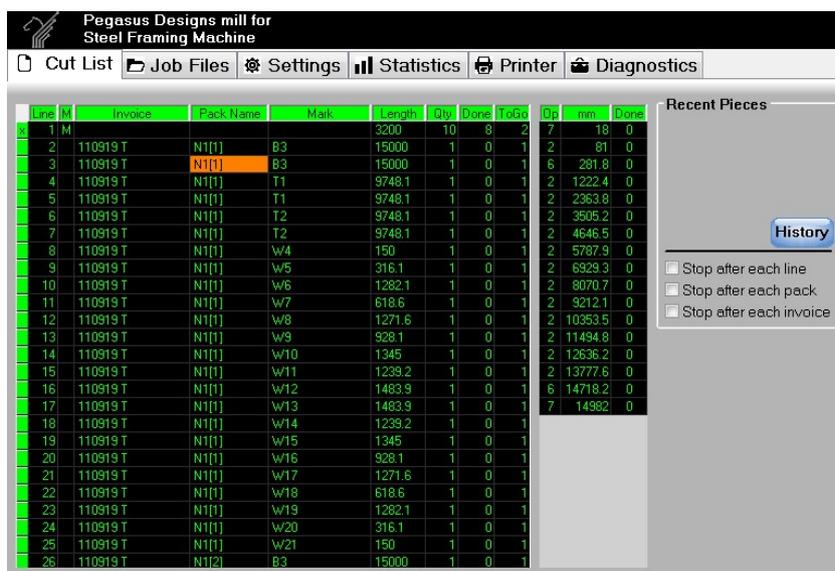


Figure 16 – Cutlist History Button

To use this feature stop the machine. Click “History” and the history will be displayed

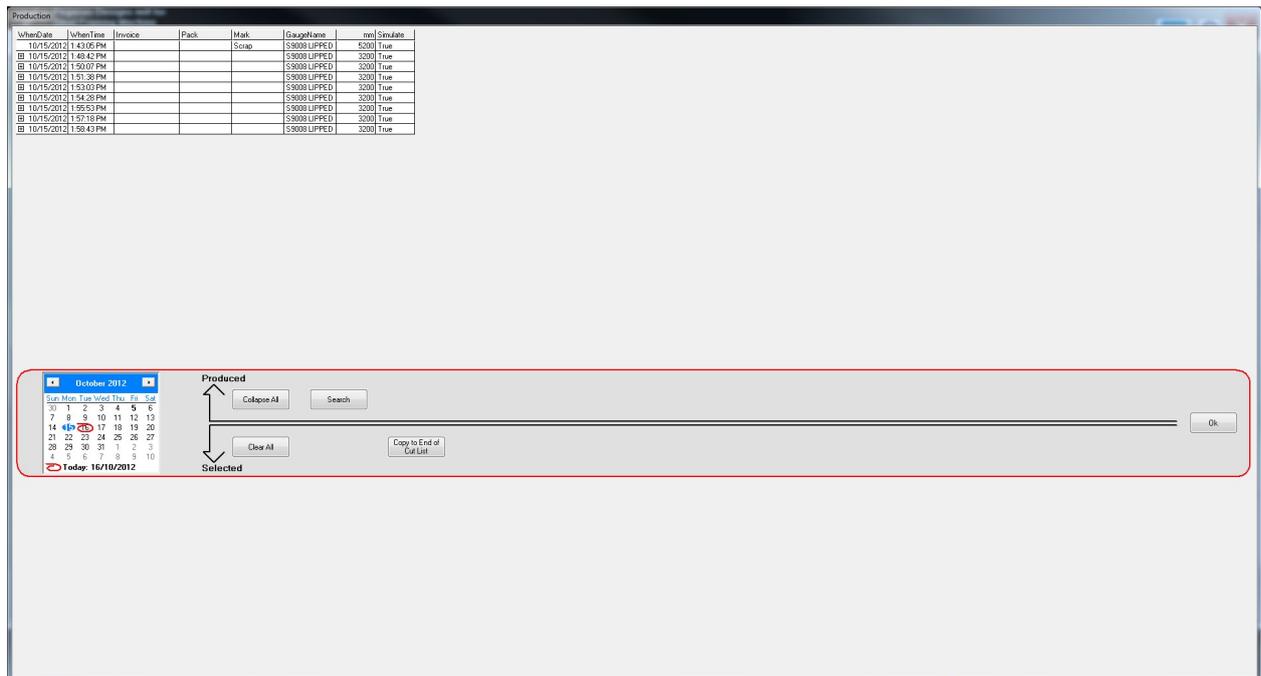


Figure 17 – Cutlist History File

Double click on a recent piece and choose ‘Add to copy list’
Click and drag over a section of pieces and choose ‘Add to copy list’

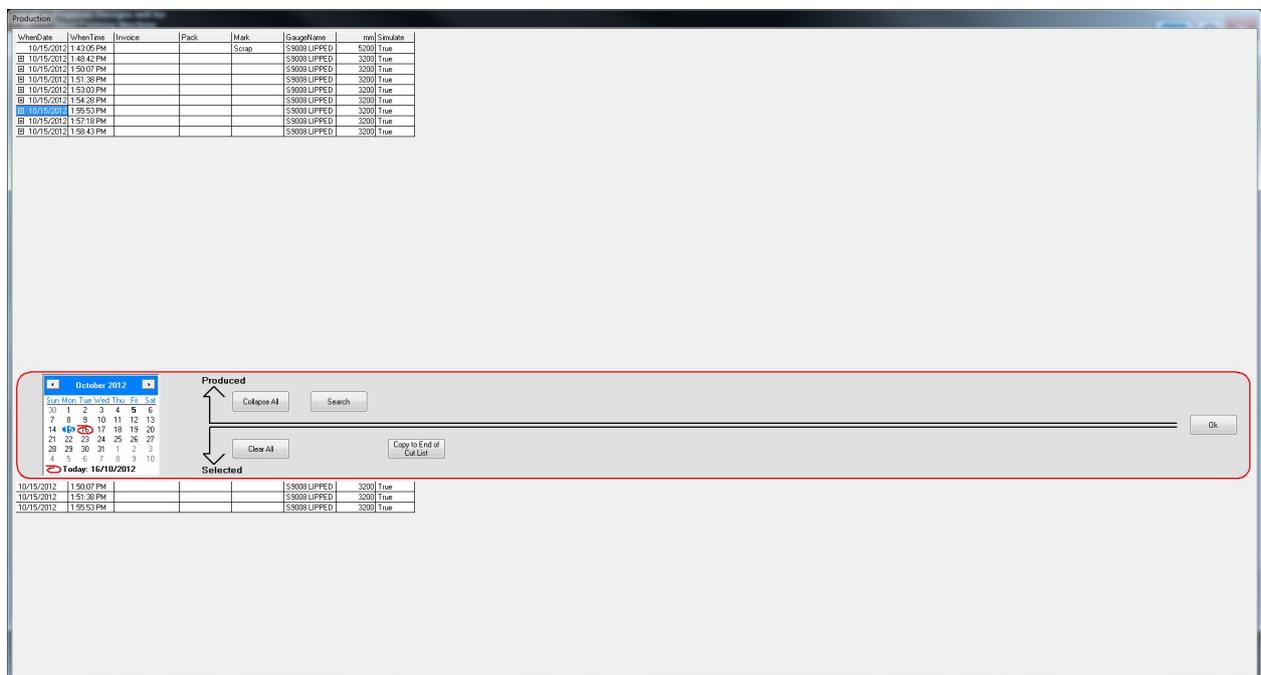


Figure 18 – Adding Previously Run Pieces back into Cutlist from History

A collection of pieces will now appear below the moveable tool bar. Once complete press ‘copy to end of cut list’ then ‘OK’ to return to the program.

To find pieces made further back in history.
 Double click 'Search'

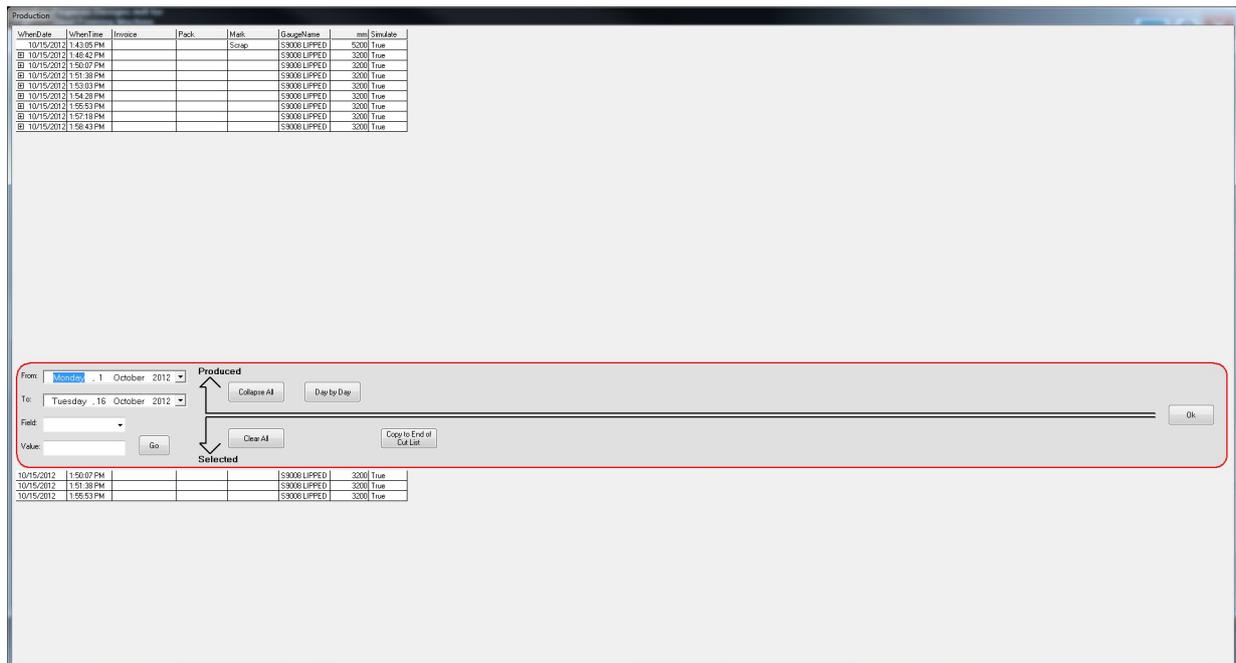


Figure 19 – History Search Function

Choose a Date range

Choose a Field to search 'Invoice' or 'Mark'

Choose the Value to search say BP1

And the search engine will search for all BP1 made within the date range. With all the searched values shown above the line.

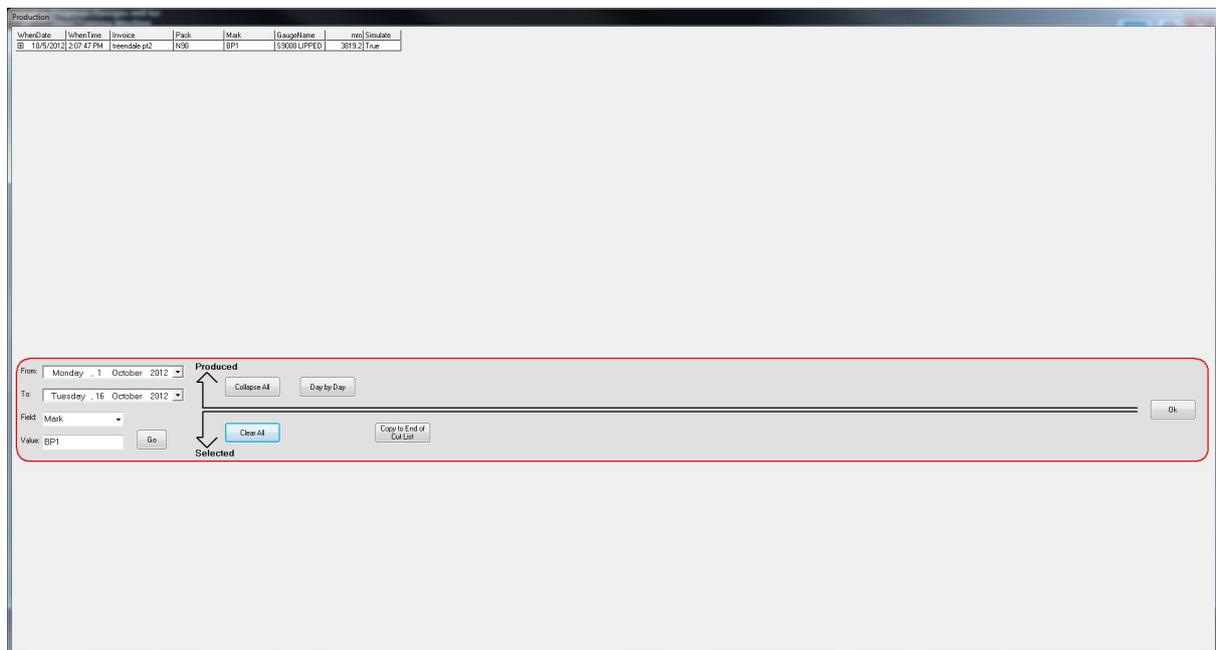


Figure 20 – History Search via Selected Fields

Now the operator can choose the piece by double clicking on it, Add to copy list, then double click 'Copy to end of Cutting list' and OK to return to program.

3.1.7.5 Statistics Page

By clicking on the Statistics tab you are able to see how many hours and metres the Rollformer has rolled also view how many cycles the Shear and Punches have performed. Toggle the alarm ON or OFF as required. When any alarm value is reached a notification is displayed in the warning box. This warning can be ignored but it is suggested that suitable preventative maintenance is performed. Once complete. Double click on the Alarm Value. Press backspace and set a new alarm limit.

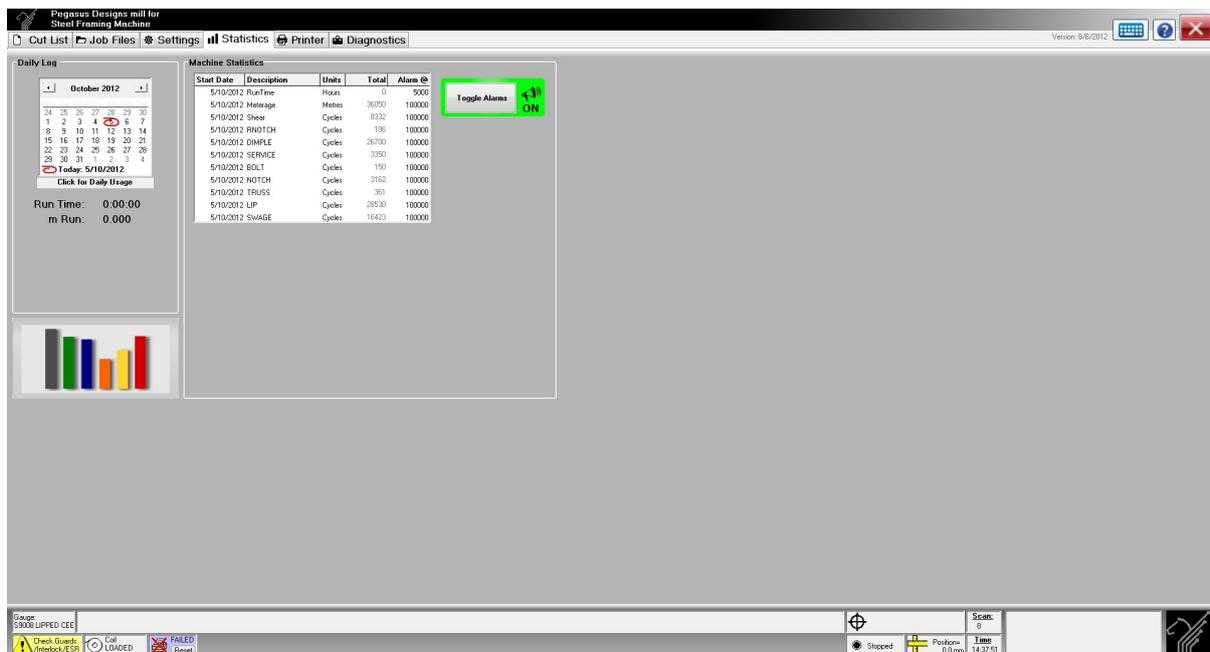


Figure 21 – Statistics Page

The Alarms and statistics are designed to assist with preventative maintenance or as a tool to monitor tool quality or sharpness.

Maintenance managers are able to log failures of components VS number of cycles, Meters or Hours to improve maintenance procedures.

4 Functions and Diagnostics

There are many diagnostic features included in the Pegasus PC Framer software to assist in fault finding, setting up, optimising the machine and for other general information on the status of the machine. Some of the more important statistical functions can be seen on the status bar of the program, located across the bottom of the screen. For example the status of interlocks and the current position of the current piece as well as the printer status and type and position of the last operation, are always visible on the Pegasus PC Framer software as they are located on the status bar.



Figure 22 - Status Bar

Other information and diagnostic tests are available on the **Diagnostics** screen

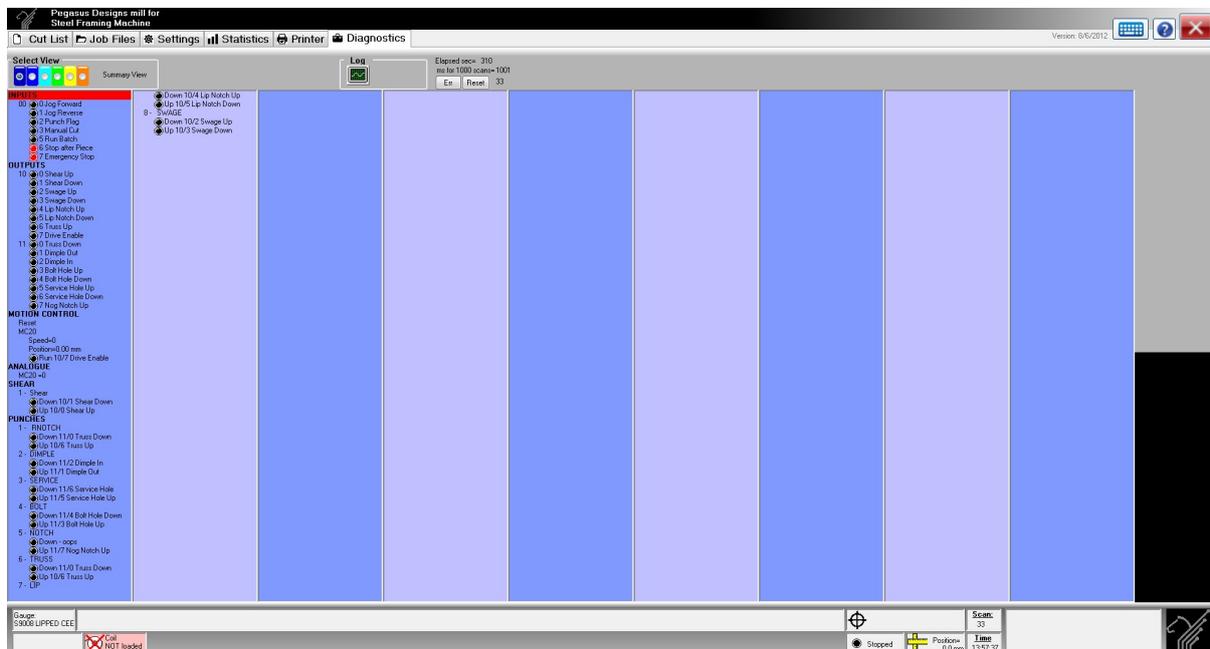


Figure 23 - Diagnostics Page Summary View

This screen shows a complete overview of all the inputs and outputs of the controller.

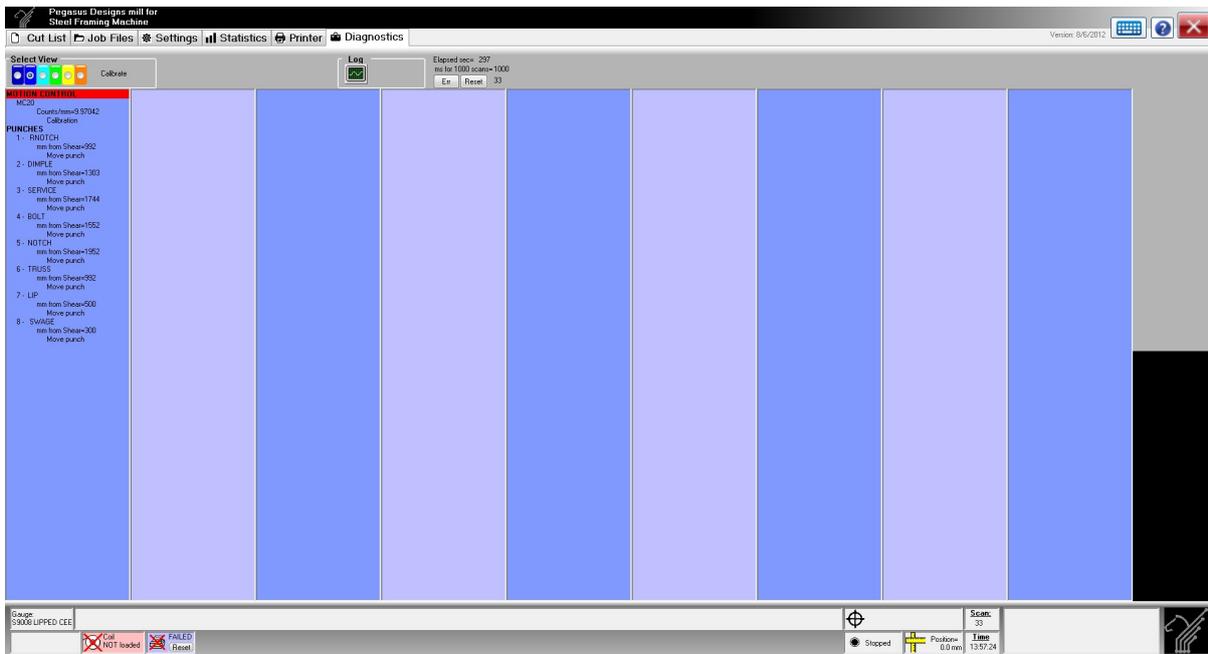


Figure 24 - Diagnostics Page Calibrate View

This screen shows the calibration of the encoder in counts per millimetres and also the position of all the punches (mm from Shear). From here you can recalibrate the encoder and move the punches when necessary. To recalibrate double click on the word Calibration a new window will open.

Prior to carrying out the re-calibration of the wheel it is strongly recommended that the mechanical integrity of the measuring wheel and sprung support be checked to ensure that no problem exists in this area.

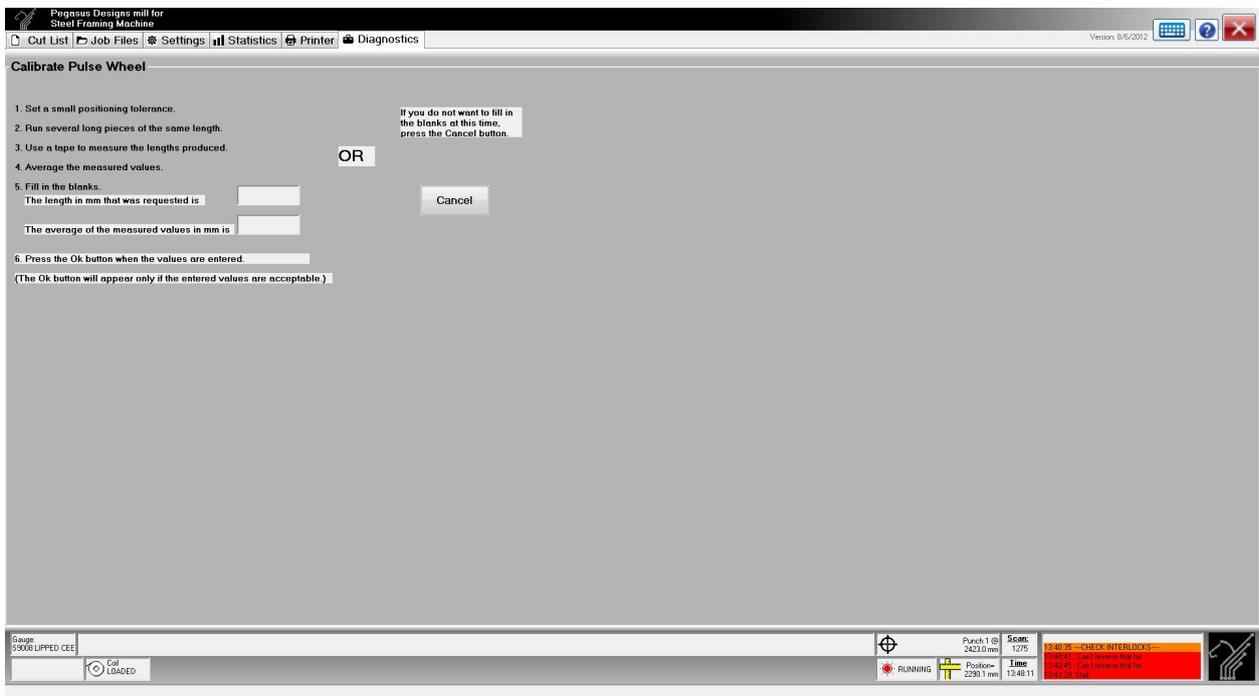


Figure 25 – Recalibration Screen

On this screen enter the values as requested, you will only be allowed to change the calibration if it falls within 10% of the current value.

The correct set-up, adjustment and calibration of the measuring wheel system is **unquestionably the most important** requirement to ensure that satisfactory results will be achieved. The length of product should be checked regularly and after each coil change.

Experience has shown that the following are common causes of measuring inaccuracy:-

- Spring loading system not properly in place or not moving freely.
- Measuring wheel not firmly attached to the shaft of the encoder support assembly.
- Wheel support system not moving freely.
- Build-up of dirt or tape on the measuring wheel.
- Wheel slipping on the feed material.
- Wheel not in full line contact with the feed material (i.e., shaft not parallel to product.)
- Wheel "jumping" and moving due to vibrations when the shear or punches operate.

Note: The measuring wheel **must** be observed **very** carefully during an **actual** metal cutting operation to detect this problem.

If re-calibration of the wheel is carried out in the presence of mechanical faults in the wheel mounting system the entire exercise will prove to be useless and the results to be most unsatisfactory and confusing.

It is important to note that changes to surface finish of the material can affect the calibration of the wheel. This problem applies to **all** measuring systems of this type. The recalibration of the system is easily achieved by applying a simple mathematical formula.

An accumulation of zinc to a thickness of 0.05mm on the wheel will generate an error of 15mm over a 10 metre long piece.

Calibration errors and errors due to surface finish or wheel slip will be proportional to the length which is cut, e.g., an error of 2mm on a 3 metre length will become a 10mm error on a 15 metre long piece. If the error is not proportional to the length the problem is most certainly not related to the calibration factor and the fault must be identified in other areas. Experience has identified **slippage**, which is proportional to length. This can be most confusing and misleading should the circumstance arise.

To move a punch position - Ensure that the Length calibration is correct and within tolerance. DO NOT attempt to change a punch position until you are confident that the lengths are correct. "Click" on the Move Punch under the Punch that needs to be moved it will be highlighted in red, now press Enter, a new window will open.

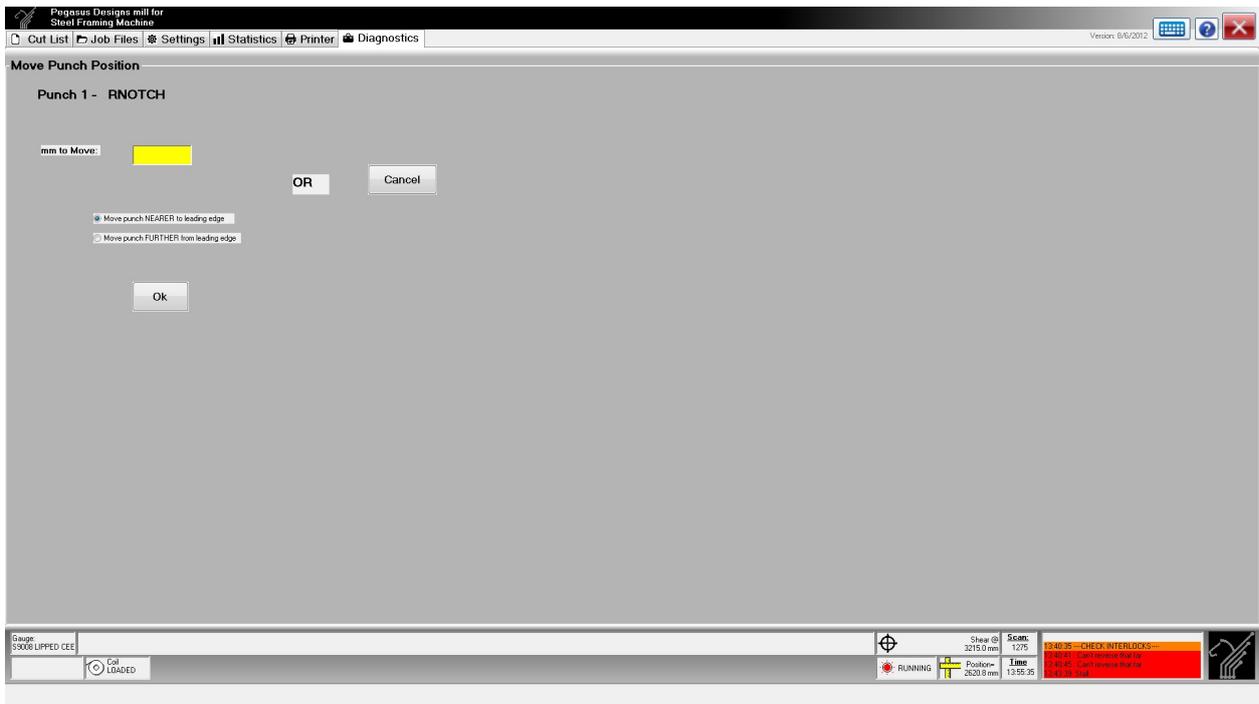


Figure 26 – Move Punch Position

Enter the millimetres that the punch needs to move and also the direction in which it needs to move. Click OK to move the move.

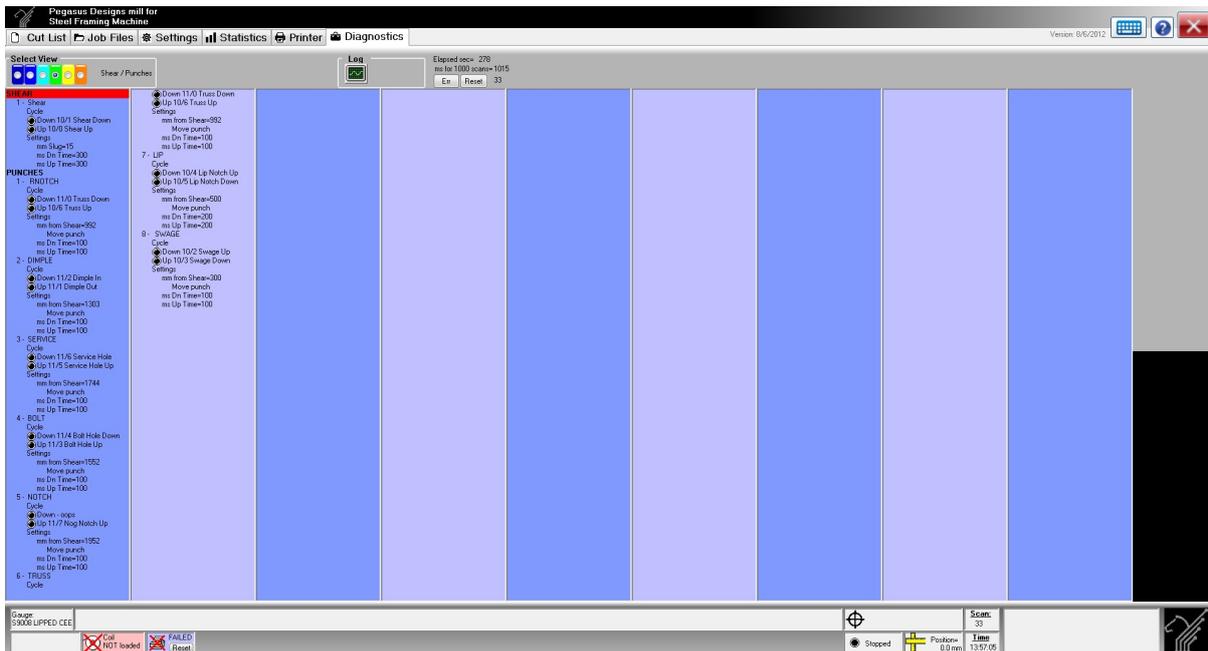


Figure 27 - Diagnostics Page Shear/Punches

In the **Shear** diagnostic menu the shear cycle can be optimised and tested. To operate the shear cycle select the cycle option and press the enter key. To optimise the speed of the cycle select the settings menu within the **shear** menu. The **ms up time** and the **ms down time** refer to the length of time in milliseconds that is allowed for the shear to return to the “up” position and the time for which the shear “down”

output is turned “on” respectively. If these times are set too short the up or down stroke may be incomplete.

Slug Width

The slug width is configurable in this section of the program this determines the width of the slug removed by the shear and consequently how much the length must be altered automatically by the computer to allow for this slug. It is **essential** that this parameter is correctly set otherwise the length and position results will be incorrect.

For all of the operations the settings include the cycle time setting and a parameter that specifies the distance from the shear to the reference point of the operation. If a particular operation is consistently out from its programmed location the position of that operation from the shear is possibly incorrect. To correct this problem adjust the **mm from shear** value for that operation by the distance the operation is away from its requested location. Calculate the distance the operation is away from the location it should be and determine whether it is closer to the leading edge or trailing edge of the piece. If the operation is closer to the leading edge of the item than it should be, then the **mm from shear** parameter needs to be adjusted by that distance closer to the shear. E.g. If we want an operation 1000mm from the leading edge and it comes out at 995 then the **mm from shear** for that operation should be reduced by 5 mm. Alternatively, if the same operation occurred at 1005 mm the parameter should be increased by 5 mm.

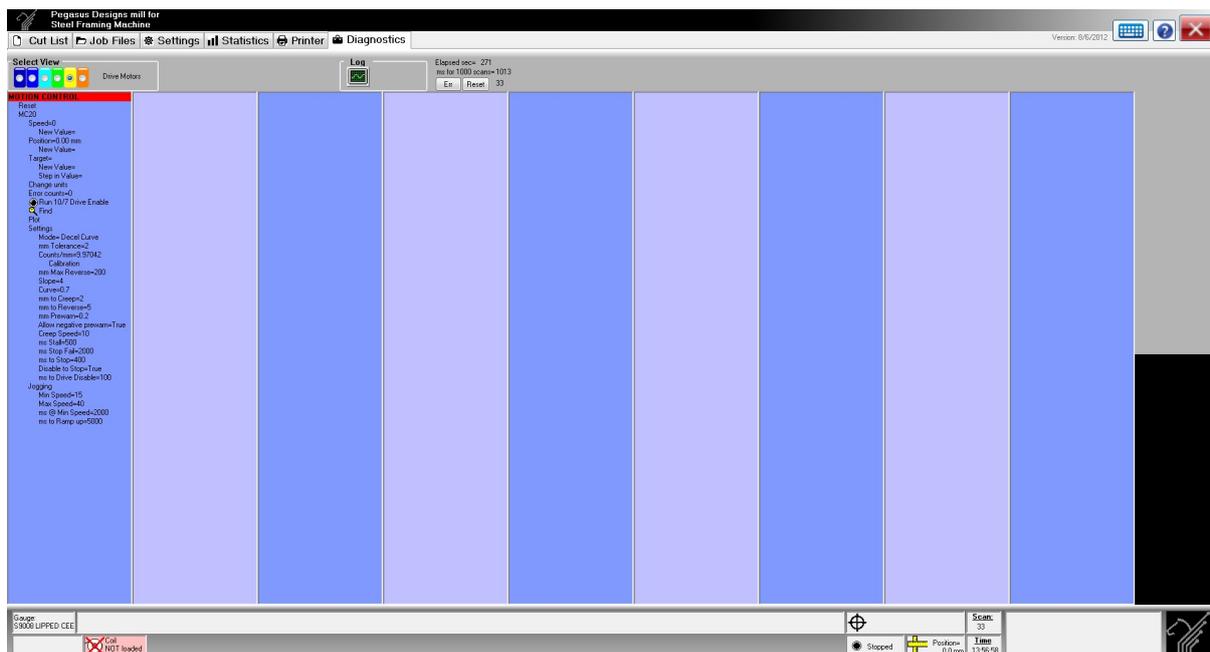


Figure 28 - Diagnostics Page Drive Motors

This screen shows the settings used for the positioning of the rollformer and also the jogging of the rollformer. If the machine is not positioning well certain values may need to be changed on this page. If the controller is cutting the pieces at the length it thinks it should and they are correct when measured with a tape measure, but are too long or too short the tolerance may be set incorrectly. You can adjust this but if it is too small the machine will hunt excessively.

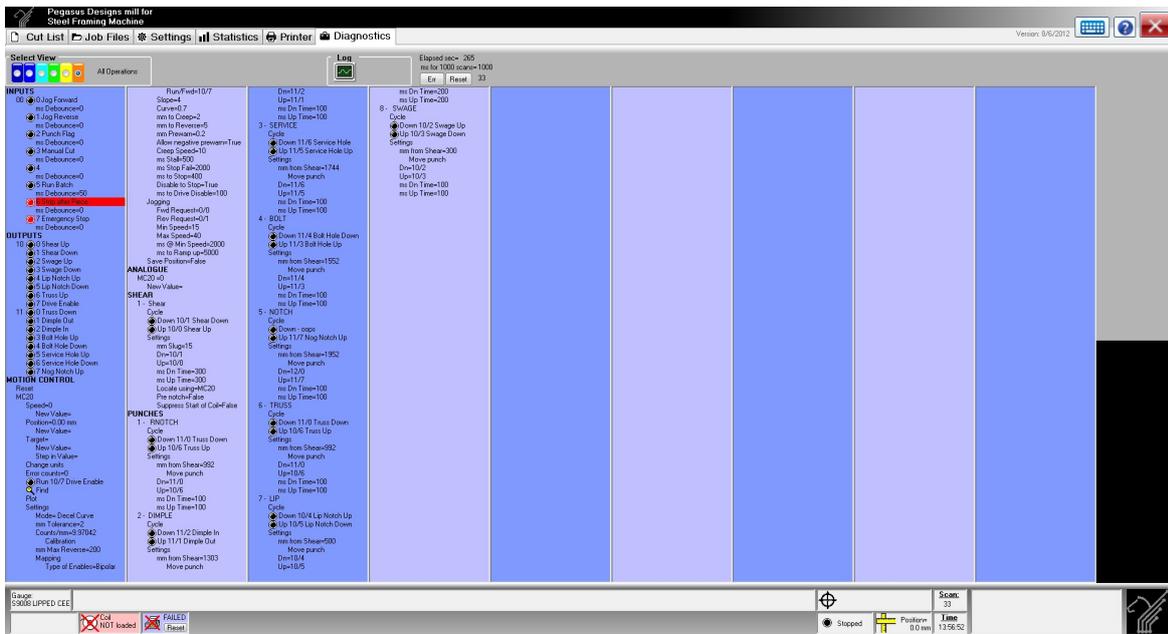


Figure 29 - Diagnostics Page All Operations

This screen shows the settings for everything available on all other diagnostics tabs.

4.1 Current Position and Position of Last Operation

The current position of the piece being run is displayed in the status bar on the bottom of the window; it is denoted by the  (ruler) symbol. The location of the next operation and its op code is also displayed in the status bar and is located directly beside the current position of the piece.

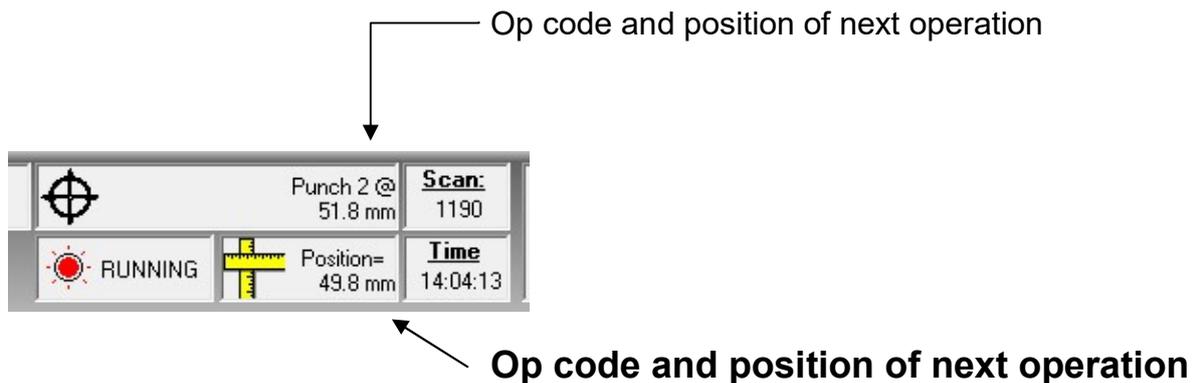


Figure 30 - Position of next operation

4.2 Printer

To perform maintenance and to check that the printer is operating correctly you will need to select the Printer Tab. Should the printer loose comms with the controller you will see the icon flashing in the status bar. To reset the printer, click on the reset button in the icon. If the printer does not reset there may another problem.

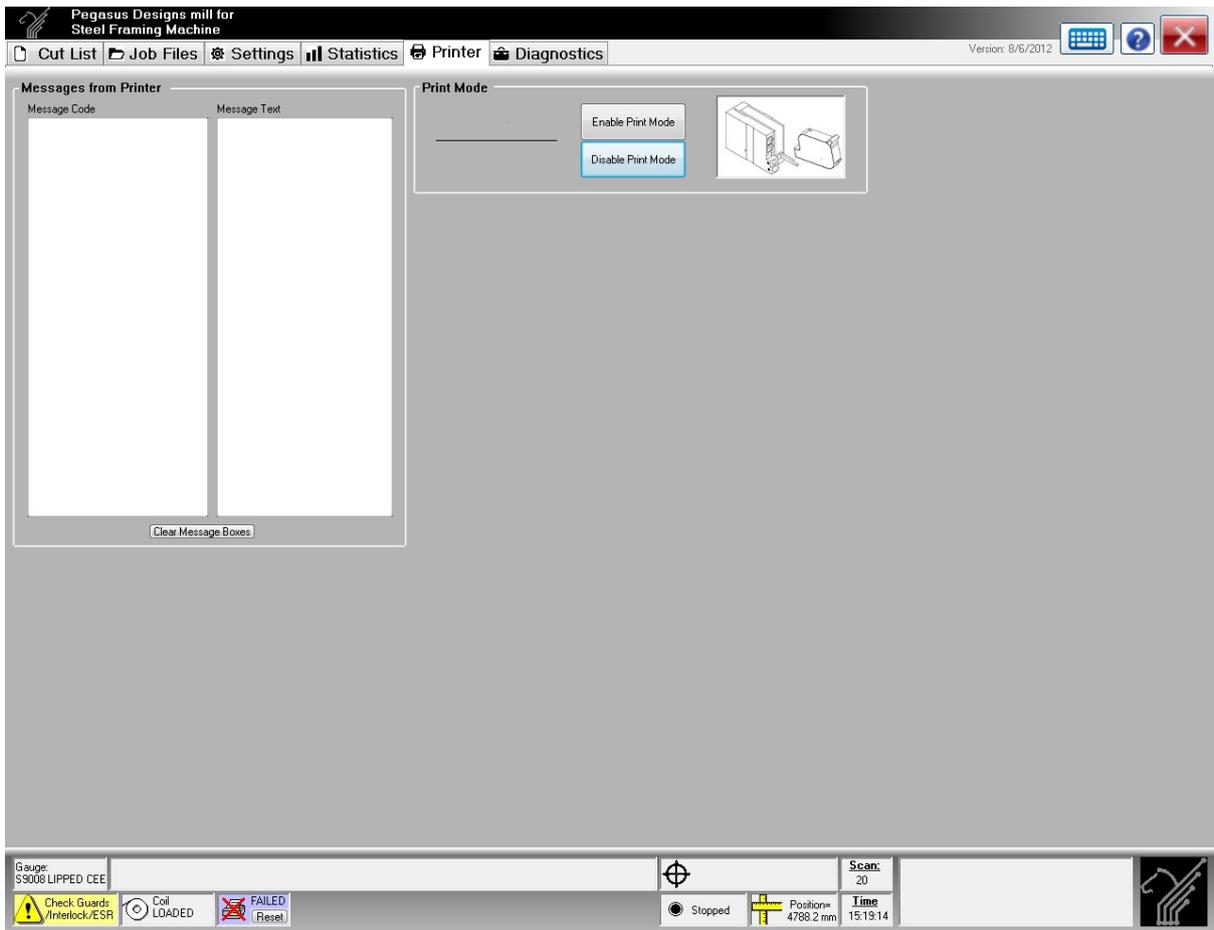


Figure 31 – Printer Tab – Evolution Printer-Comms Failed

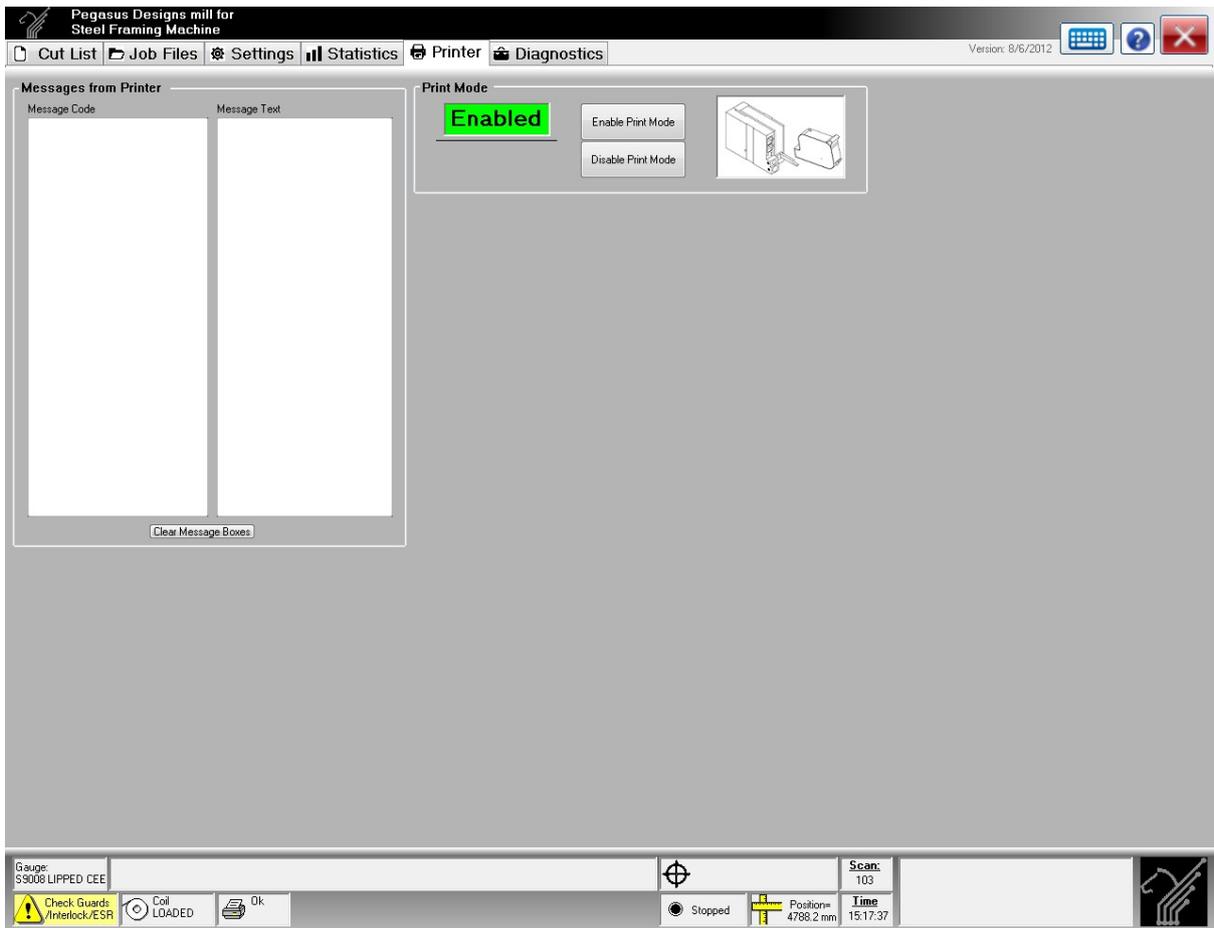


Figure 32 – Evolution Printer Enabled

When the machine is running messages that are transmitted to the printer will be displayed in the message box on the printer tab. You will also see when the printer is sent a print trigger as well.

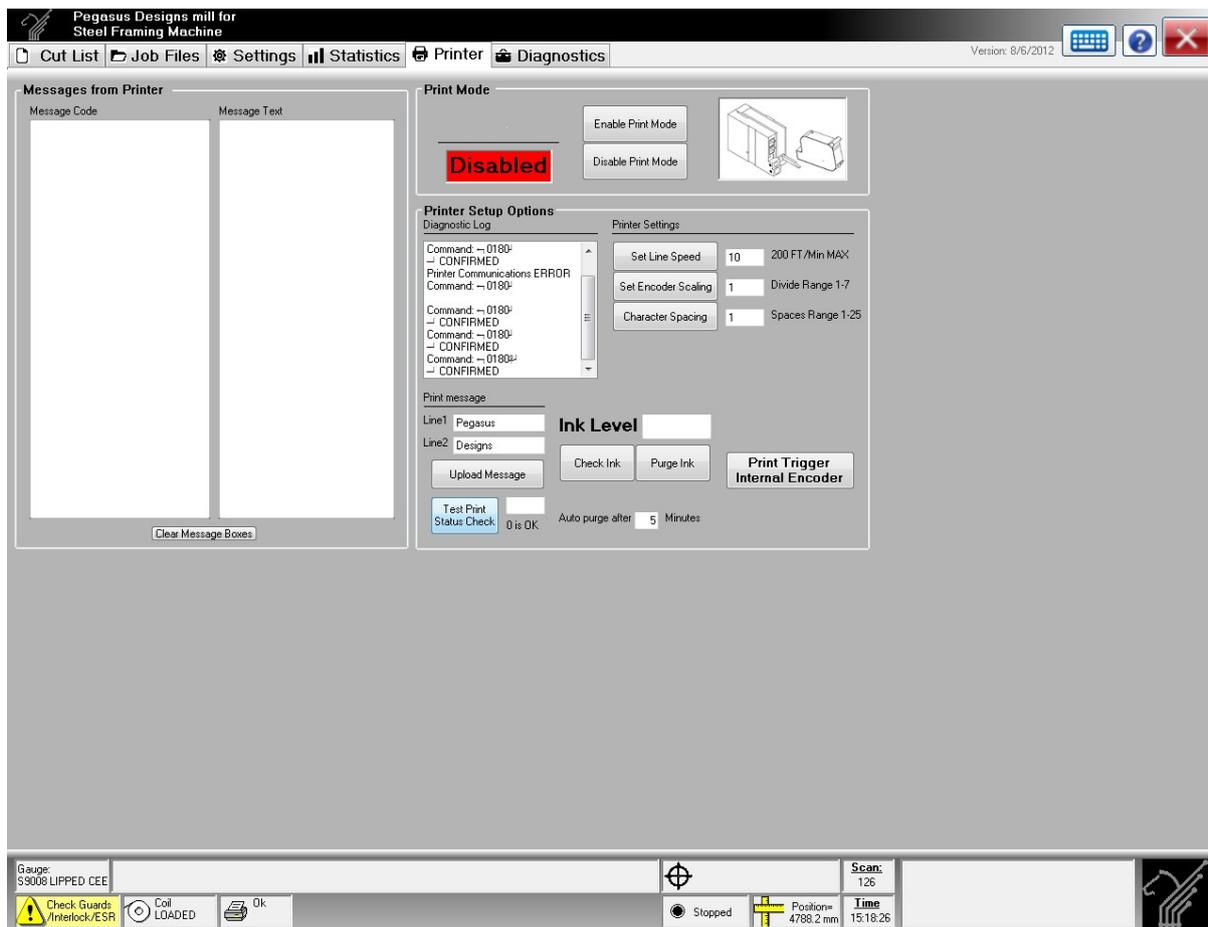


Figure 33 – Evolution Printer Disabled

To perform maintenance on the printer, click on the Disable Print Mode button. The printer is now disabled and will not print any messages if you continue to run the machine. On the icon to the right of the Disable Print Mode button, double click and type 'evo' you should now see so more functions available on the screen. From here you can purge in the printer by clicking on the Purge Ink button this will cause the printer to spray some ink out of the cartridge, this is a good way to make the cartridge is not clogged with ink. Once you have performed any maintenance on the printer, you will need to click Enable Print Mode to allow the printer to print messages on the material in the machine.

5 Testing

5.1 Encoder Tests

If it is suspected that the encoder is not working correctly, or the encoder has been changed, there are three tests to be performed. For proper measurement to occur all tests **must** be successful. Do not attempt to run product otherwise. Incorrect lengths will be produced resulting in product wastage.

5.1.1 ENCODER LED TEST

1. Display the number of COUNTS using by changing the units to counts and viewing position on the **diagnostics** screen in the **Quadrature** sub-menu.
2. Rotate the measuring wheel **very** slowly. Study the LED's on the quadrature counter board 96-20. If the rotation is too rapid, both LEDs will appear to be permanently on.
3. Both Channel A and Channel B LEDs on the 96-20 counter board should be seen to turn on and off sequentially. The number of counts displayed increase or decrease (depending on the direction of rotation). Should increase (or decrease) steadily as the encoder is rotated. If the counts vary by only ± 1 it is a sure indication that one of the channels is not functioning or not being read correctly.
4. If problems are experienced with this test check the following:
 - Disconnect the encoder from the counter board.
 - Verify the wiring.
 - Check that +12VDC is available at the four-way encoder connector.

5.1.2 ENCODER DIRECTION TEST

1. Display the number of COUNTS using same method as previously described. Note that negative numbers can be displayed. Hence rotate the wheel until the displayed number of counts is positive. This will avoid confusion during the test.
2. Turn the measuring wheel in the direction it moves when the material moves forwards.
3. The number of counts showing on the display should increase.
4. Turn the wheel in the other direction and the counts should decrease.
5. If the counting direction is wrong:
 - Swap the Channel A and Channel B wires at the four way encoder plug on the 96-20 quadrature counter board.
 - Repeat this test.

5.1.3 ENCODER DISPLACEMENT TEST

1. Make matching marks on the measuring wheel and a fixed point on the machine (with a fine felt tipped pen for example). These marks must align very accurately.
2. Display the number of COUNTS using same method as previously described.

3. Write down the number of counts shown. (Note that the value may be a **negative** number). If a Manual Cut is performed the count will be **set to MINUS the number of counts which represent the slug width**.
4. Rotate the measuring wheel at approximately the maximum sheet running speed for about 50 revolutions in the forward direction. In most systems this is equivalent to about ten metres of length.
5. Align the match marks **very accurately** when the wheel is placed in contact with the sheet.
6. Write down number of counts shown. The difference between the two positions (remember to **correctly** account for any negative sign) should be an **exact** multiple of Encoder pulses per revolution (ppr) x 4. For a 500ppr encoder this is 2000, for a 600ppr encoder it is 2400 and so on.
7. Now rotate the wheel in the reverse direction the same number of turns and the number of counts should return precisely to the original number of counts. Note that one count nominally represents a movement of 0.1mm at the outside diameter of the wheel.
8. If this test is passed there is a very high probability that the entire measurement system is **electronically** correct. There is only a **very small** chance that the operation of the encoder can be adversely effected by vibrations when running or cutting is in progress.

5.2 Input and Output Testing

To test the inputs simply check that when an input is active, both the LED indicator on the input board and the indicator in the **Diagnostic** screen of the Pegasus PC Framer Software.

Two types of test are available for punches and the shear.

The first system employs a static technique. From the diagnostics screen any output can be turned on or off at will by pressing the space bar. Do not hold the space bar down or the output selected will turn on and off rapidly. The corresponding LED on the 96-30 relay board should light when the output is turned on. To identify the correct LED note that the LED "bits" are numbered from zero at the top of the output board to seven at the bottom of the board. The bits are numbered similarly on the diagnostic screen. This diagnostic technique is extremely powerful and allows ample time for fault tracing and testing.

The second technique is dynamic and applies to the punches and the shear and will test the complete cycle by turning on the relevant outputs for the time set by the parameters. To use this system in diagnostics select the punch or shear to be tested and scroll to the corresponding "Cycle" box. Press "Enter" to perform the automatic cycle for the selected device. The various timing parameters for the device may be modified at this stage.

The hydraulic system requires that a "loading" valve is energised at the same as another operation valve to cause the system to deliver hydraulic power. This is performed automatically by using diodes in parallel with all other operations.

6 Communications

The Pegasus PC Framer uses Windows 7 Operating environment can use any networking system most suited to the factory environment. A variety of customers use a mixture of Windows 7 Networking solutions

- Wireless
- Ethernet
- USB (Manually walk from office to Machine)

7 Maintenance and Cleaning

The most essential component of the system is the measuring wheel and as such it must be regarded with the utmost care and respect.

The Printer Heads require constant Maintenance cleaning and respect. Refer to the printer manufacturers instructions for most reliable operation.

7.1 Calibration of measuring wheel

The correct set-up, adjustment and calibration of the measuring wheel system is **unquestionably** the **most important** requirement to ensure that satisfactory results will be achieved. The length of product should be checked regularly and after each coil change.

Prior to carrying out the re-calibration of the wheel it is strongly recommended that the mechanical integrity of the measuring wheel and sprung support be checked to ensure that no problem exists in this area.

Experience has shown that the following are common causes of measuring inaccuracy:-

- Spring loading system not properly in place or not moving freely.
- Measuring wheel not firmly attached to the shaft of the encoder support assembly.
- Wheel support system not moving freely.
- Build-up of dirt or tape on the measuring wheel.
- Wheel slipping on the feed material.
- Wheel not in full line contact with the feed material (i.e., shaft not parallel to product.)
- Wheel "jumping" and moving due to vibrations when the shear or punches operate.

Note: The measuring wheel **must** be observed **very** carefully during an **actual** metal cutting operation to detect this problem.

If re-calibration of the wheel is carried out in the presence of mechanical faults in the wheel mounting system the entire exercise will prove to be useless and the results to be most unsatisfactory and confusing.

It is important to note that changes to surface finish of the material can affect the calibration of the wheel. This problem applies to **all** measuring systems of this type.

The recalibration of the system is easily achieved by applying a simple mathematical formula.

An accumulation of zinc to a thickness of 0.05mm on the wheel will generate an error of 15mm over a 10 metre long piece.

Calibration errors and errors due to surface finish or wheel slip will be proportional to the length which is cut, e.g., an error of 2mm on a 3 metre length will become a 10mm error on a 15 metre long piece. If the error is not proportional to the length the problem is most certainly not related to the calibration factor and the fault must be identified in other areas. Experience has identified **slippage**, which is proportional to length. This can be most confusing and misleading should the circumstance arise.

8 Pay Per Use/Royalty

Copy Pay Per Use/Royalty Code into the Pay Per Use/Royalty Folder, there is a shortcut to this folder on the desktop.

Start the Pegasus PC Framer Software and select the Security Tab

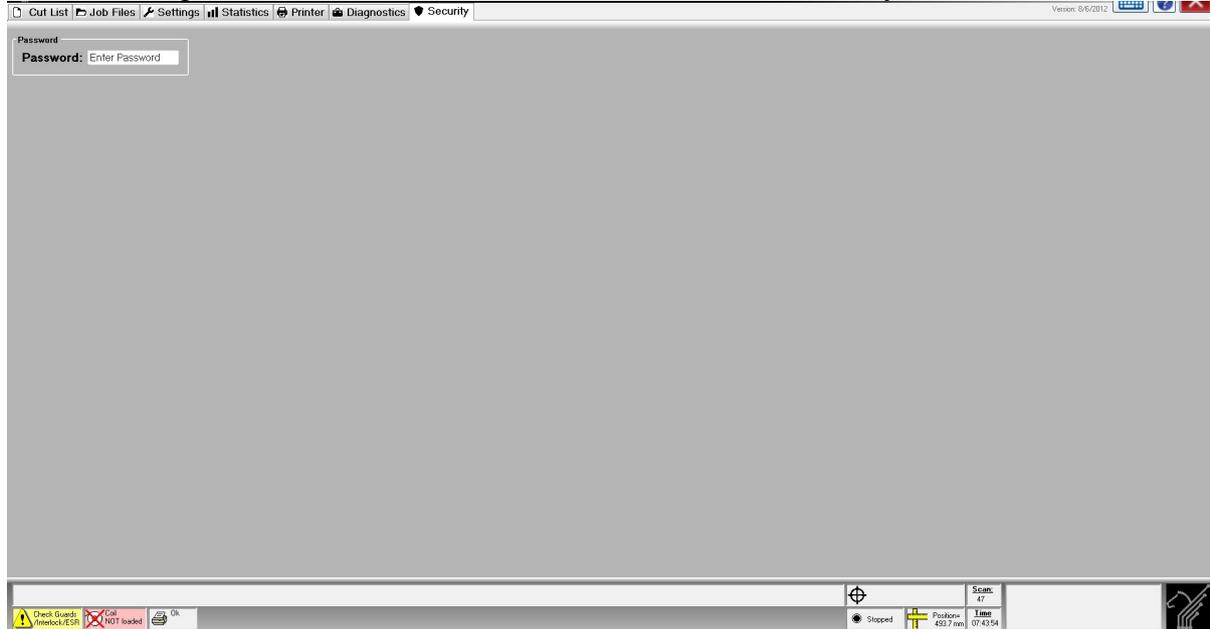


Figure 34 – Security Tab

Type Password 'SUPERVISOR'. Then press Enter

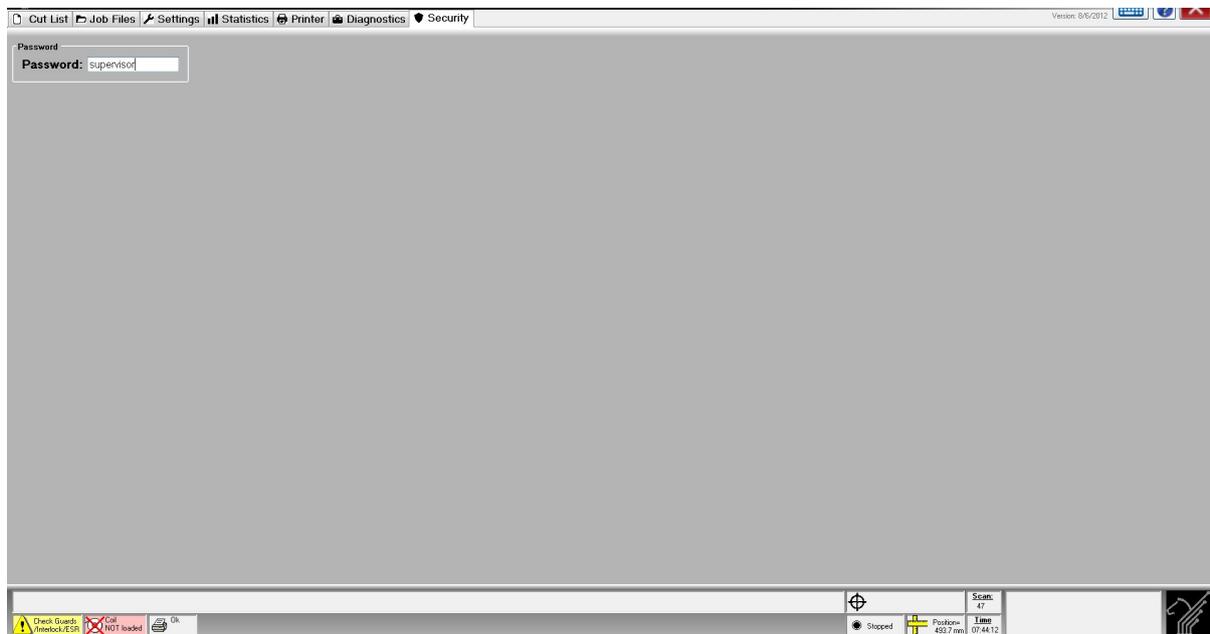


Figure 35 – Supervisor Password

Enter the Filename and the amount of metres purchased. This needs to match the information that is in the Pay Per Use/Royalty Code that was copied in the Folder in the previous step.

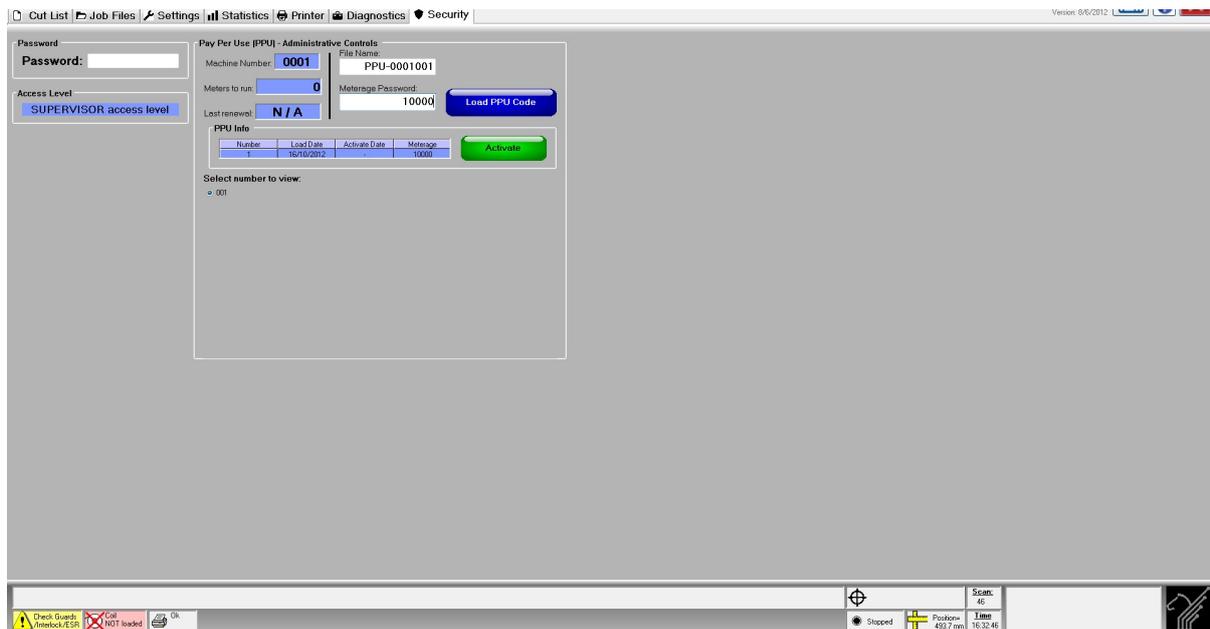


Figure 36 – Loading Metres

If there is a file with the meters and filename matching you will be able to load this file. You can now select the code number, and select activate. If successful your Meters to run will now display the meters that were purchased plus any remaining on the machine.

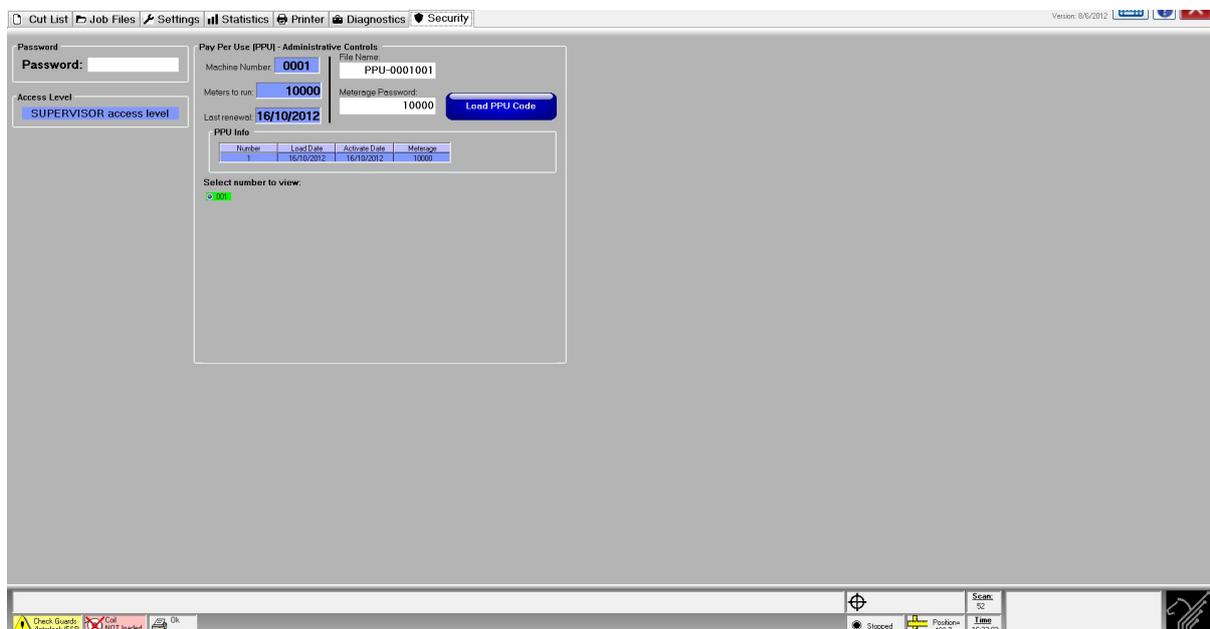


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