Justification for a Press Automation Control System

Press Automation Control Systems (PAC's) significantly impact pressroom productivity. These systems provide multiple benefits:

- **Significant reduction in die damage**
- **Increased press uptime**
- **Reduction in direct labor**
- **Improved part quality**
- **Less machine maintenance**
- **Longer tool life**
- **Faster setup time**
- **Potentially increased press speed**.
- **Improved plant safety**
- **Eliminate manual data collection and provide a realistic view of plant efficiency.**

The impact of these benefits is generally obvious to the manufacturing staff but require quantification for the financial decision makers. Payback on this type of system is generally expressed in weeks – not years!

Getting a grasp on current costs is an important first step.

Reduction in die damage. Costs associated with die damage are generally available in a broad form; namely, costs associated with the tool room and/or orders issued to outside tooling houses for repairs. What you really want for an accurate cost justification are the tooling repair costs associated with those machines and tools that you intend to apply press automation to. These will normally be the coil fed presses/tools as it's less common to apply automation and/or die protection to secondary operation.

Assuming the damage cost information is available it's prudent to estimate a reasonable high percentage, but not all, repair costs can be eliminated. Tooling damage directly related to double hits – part ejection failure, misfeeds, dropped or mislocated parts during transfer, air cylinders/cam failure, and slugging can generally be detected and prevented. Tooling damage related to setup error generally will not be eliminated.

Operations with 5 or more coil fed presses can often save $25,000 or more per year in tool repair by installing a press automation control system.

Labor saving – the potential is huge! Consider one operator to run two presses, better yet, one operator for 3 or more. Job run lengths, press location, union rules, setup time and other variables affect what can be accomplished. Regardless; it almost always possible to run two presses with a single operator. Annual savings = the fully loaded hourly cost of an operator eliminated x 2080 hours x number of operators eliminated.

Increased uptime can be estimated. Die & press damage and its associated repair results in lost production time. If a tool needs to be removed for repair and a tool for the next job is not immediately available the press downtime may be significant. A simple estimate might include 2 hours of downtime for every unplanned tool repair that required the die to be removed from the press.

Reduced press damage The potential for increasing uptime by reducing the potential for major unplanned press repair is also significant. For example; consider the lost production time due to a broken crankshaft. Most press automation control systems include load monitoring systems which act like a life insurance policy for the press. Overloading caused by setup error, shut height creep, excess material thickness and hardness can be dramatically reduced. This not only increases run time but directly reduces maintenance costs. A reasonable means to quantify this is to take the average of press repair costs over three years and multiply by 50%.

Longer tool life - An increase in tool life is a direct result of reducing the number of die crashes which is accomplished with the die protection part of the press automation control system. In theory a load monitor can be used to optimize grind schedules. Tonnage required to produce a quality part tends to go up as the tool wears. This is not a linear function. For example: a given die can be removed after 100,000 hits and only require a grind of .005" to be sharp. Running to 120,000 hits may increase grind required to .015". In this case the extra 20,000 hits cost you .010 in grind life. Monitoring the point at which the slope of the tonnage curve changes potentially allows the user to optimize grind schedules; thereby, increasing tooling life. This may prove to be a difficult area to quantify. The increase in tool life will need to be an estimate based on your expectation for the increased life of the tool and its original cost.

Improved part quality is easy to quantify when a known, recurrent, and measurable quality problem exists. If you've had to visit a customer site to sort a shipment with rejects you're acutely aware of how the cost of quality problems mounts up. Advanced press automation control systems not only feature die protection but also offer analog sensing for in die measurements. This allows users to implement "in die" quality control systems. Measurements can be made on hole diameter, bend angles, part thickness, etc. When at out of acceptable range condition is detected the system can immediately stop the press. Alternatively the user can require that a certain recurring number of out of range conditions must occur before stopping the operation. A shift register can allow the operation to continue and eject bad parts into a separate container at the end of the tool.

Shorter set up times – Press automation control systems can automatically process a number of setup variables. Parameters such as: shut height, press speed, feed length, feed speed, feed angle, pilot release timing, part blow off timing, tonnage limits, die protection requirements, etc. may be stored to local memory. Once a new tool is entered by the operator these values are directly loaded and executed. This may reduce setup from 5 to 15 minutes depending on the situation. You'll need to add the loaded hourly cost of the setup man + the uptime run rate for the press x the estimated time saved per setup then multiply the # of setups on the press. You may greatly benefit by taking a video of a typical setup to determine how much time is taken on tasks than could be automated with the PAC.

Increased press speed – Obviously machines must be equipped with a variable speed drive or so modified. Frequently we find that speed limitations are imposed on a given job due to the fear of crashing a die. With the right die protection in place the speed can be increased knowing that press automation control is keeping a watchful eye. An increase of 10% or more in these cases is very realistic.

Improved safety – A press automation control system must be integrated with appropriate point of operation safeguarding devices. Regardless; the PAC functions greatly reduce the need for employees to access the point of operation. Die protection reduces die crashes and the risk of fragmentation injuries. This benefit may be difficult to quantify but it's accepted by all that safer work places are more productive.

Reduced data collection time and improved accuracy – Connecting your press automation control to a data collection software network will produce several benefits. The PAC knows if a machine is running or stopped, how fast it's running, good parts count, & bad parts count and will report this information to the data collection system in a timely & **unbiased** fashion. If the machine is down for a reason unknown to the PAC it will generally require an operator to enter a downtime reason. Direct cost saving results from a reduction in labor costs to manually collect, collate, and distribute data. Additional savings are likely to occur as a result of having more accurate and timely data. If you have a person spending 4 hours per day dealing with data collection tasks @ $20/hour you'll save $20,000 year.

Software packages vary but the best versions will generally allow you to calculate true "OEE " operating equipment efficiency. This information will allow you to make decisions that maximize the use of your assets. Some of the software tracking systems will allow you to view the machine status from a remote workstation; thereby, saving supervisory time.

Payback example for 6 automatic presses:

Yearly Savings	Y1	Y2	Y3	Y4	Y5	Y6	Y7
Reduced die damage	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Labor savings – 3 operators x $30K/yr	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000	$90,000
Reduced press damage	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000	$12,000
Increased uptime – 300 hours x $.05 per stroke x 60 spm	$54,000	$54,000	$54,000	$54,000	$54,000	$54,000	$54,000
Longer tool life	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Better quality – reduced scrap	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Faster setup – 5 min/setup x 12 setup/day x $20hr	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
Higher speeds	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Improved data collection	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Total savings	$226,000	$226,000	226,000	$226,000	226,000	$226,000	226,000
Equipment cost – 6 presses	102,000						
Installation – 6 presses	$36,000						
Data collection software	$20,000						
Computer & cabling	$7,500						
Total capital costs	$165,500						
Payback in weeks	38.08						
ROI	122%						

PRI can provide you with a custom payback, ROI, and/or present value calculation based on your actual data.