Quantifying the Business Opportunity

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GP*Allied*, LLC
4200 Faber Place Drive
Charleston, SC 29405

Phone 888.335.8276
Fax 843.414.5779

info@gpallied.com
www.gpallied.com

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Quantifying the Business Opportunity

The very first challenge with any improvement initiative is to demonstrate that spending money to improve something will actually yield a return. Essentially, we must build a business case to show that the investment in the initiative is worthwhile. While most people understand this, the challenge comes in the next step: agreeing on performance standards.

Many rules of thumb exist that suggest improving your lubrication program would garner a 10% reduction in maintenance costs, or that implementing RCM would improve productivity by 20%, or that implementing precision alignment standards would decrease energy consumption by 7-11%. While all of these have been true for scores of plants, when it comes to our plant, we are skeptical about attaching our name to a business case that is built on rules of thumb, no matter how historically reliable they may be. So, what is the answer?

Business cases built on actual data versus rules of thumb are usually much more successful in garnering support. Then enters the next challenge, and that is one of design parameters. Immediately, people begin to argue about whether a machine could do this or should do that, and whether or not it was designed for this rate, or remember that one day for about an hour it had actually done twice that, and so on.

Debates rage on about design capacity versus actual capacity and quickly turn into philosophical debates about unrealistic expectations versus theoretical design and actual performance. These debates are further aggravated by the ever-present "well, when I ran these kinds of plants, I routinely got 30% more out of it than you are" type of comments. When the dust has settled, we are no closer to an agreed upon process maximum than when we started the debate.

This is where Process Weibull Plots can help. Immediately, 99% of those conversations become moot. Why? Because Process Weibull Plots simply take a look at a plant's actual daily production, find the repeatable patterns of demonstrated production capacity, and show the effects of removing variation from the process and holding that level of performance for a longer period of time. Thus, the opportunity case for improving the performance of a given line becomes a strictly scientific exercise, based on actual data and void of any opinion or conjecture. The findings are clear, and the hidden capacity of the production line is simply and quickly calculated, thus making the monetization of process losses easy and painless.

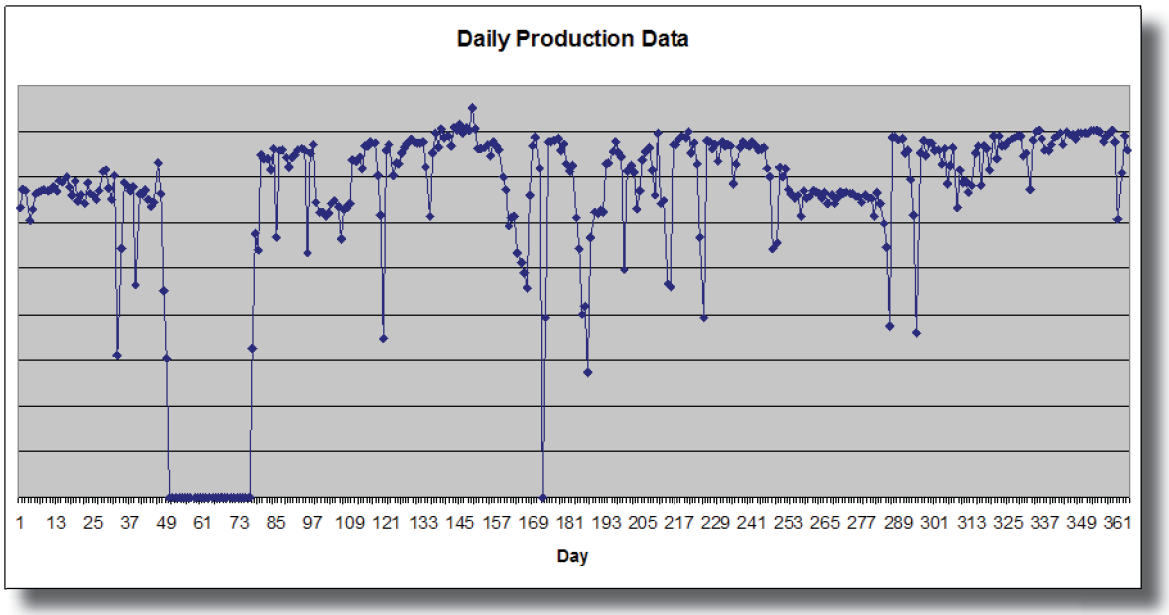
The message is based on demonstrating the business value of employing science and engineering as a process improvement tool that can visually bring the value proposition we offer to life. These plots allow us to provide a clear vision of gains a process line can make, and only requires an hour or so of our effort using one year's worth of daily production data in order to do so.

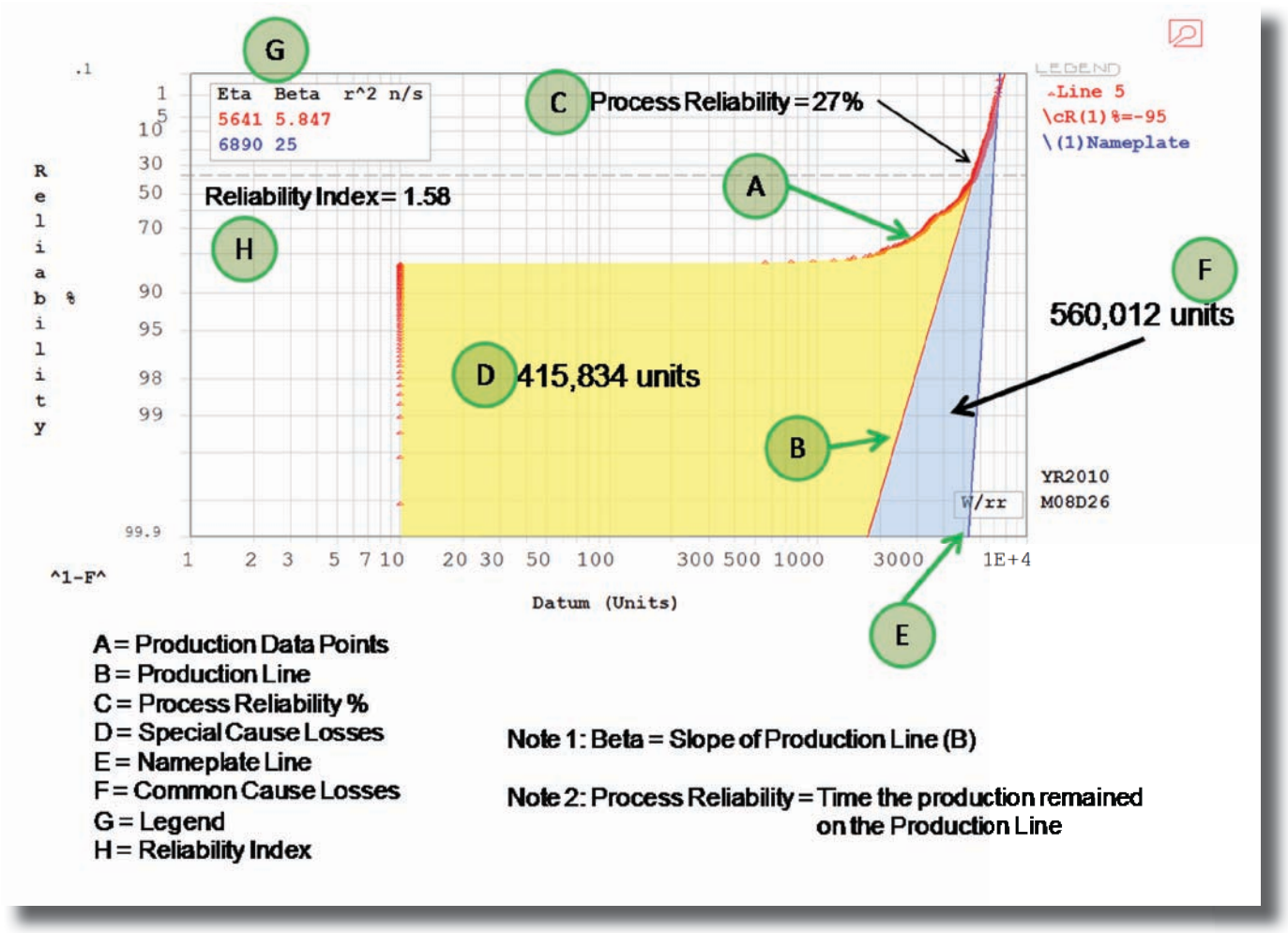
What Is a Process Weibull Plot?
Process Weibull Plots, or more simply process plots, represent a new way of looking at production data. In most cases, industries look at their daily production data in a time plot format, as shown below.

In other words, they show production data from day-to-day and calculate averages, standard deviations, and in some sophisticated cases, they even generate Statistical Process Control (SPC) values for understanding when they may be losing control of their process.

This data is valuable for running day-to-day operations, but it is not extremely valuable when it comes to understanding the value of gains from improving process control and reliability levels. Process plots give us that capability.

The process plot provides a wealth of information at a quick glance. With this plot, we are able to see the line's normal level of process control and the point at which process reliability is lost.





Beta Value	Control Level
5	Poor
10	Fair
25	Tight
50	Excellent
100	World Class (Potential Six-Sigma)
200	Seldom Achieved

The Beta value of the plot is the prime indicator of the level of control. The point at which the plot strays from the production line is where process reliability is lost. We can then calculate the production gains that can be made from improving process and asset reliability, as well as the gains that can be made from improving overall control of the process.

How Would We Use This Information?

Performance is a function of three things: 1) your rate; 2) how much variation you have in that rate; and 3) how long you were able to maintain that rate within a given level of variation. It takes all three factors to attain high levels of performance. Let any one of the three drop and line performance is significantly affected.

Process plots are excellent ways to measure all three, and the data from the analysis of these plots can be used in numerous ways.

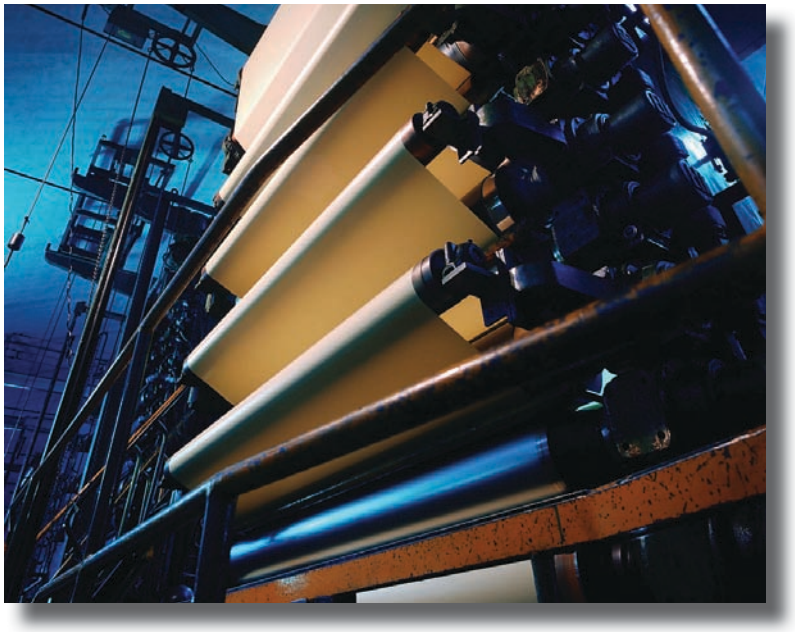
Line Monitoring and Performance Improvement

The Special and Common Cause Losses can be calculated and used to benchmark a process line. Special cause losses are those losses associated with significant amounts of downtime. These losses are very often the result of commercial downtime, equipment failures, problems with raw materials, and/or supply chain issues. Common Cause Losses are a lot harder to track and, when not using process plots, very difficult to quantify. Common Cause Losses are those losses that are usually the result of short process interruptions, equipment changeovers, variations in raw materials that result in jams, variations in operators, etc.

Hidden Plant Capacity Calculations
The losses associated with a line equate to production units lost. Recovering those lost units in the future means more production from the same amount of invested capital. The losses can add up to numbers so large that capital dollars need not be spent. Meaning, if enough lines have enough hidden capacity, then additional lines need not be built if the business is in a sold-out state. If the business is not capacity constrained, then two shift operations could be reduced to single shift operations, provided enough of the hidden plant capacity is uncovered.

In summary, using a production line's actual daily output to calculate line performance characteristics and the amount of hidden capacity is fairly straightforward utilizing Process Weibull Plots. These plots relieve the analyst of the burden of the traditional engineering versus actual performance set points and enable a useful and believable calculation of line performance.

How would you shift Beta and increase Process Reliability?



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