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THE **FATAL FLAWS** OF
FIRST GENERATION
MONITORING SYSTEMS

AND HOW TO BREAK FREE
FROM MEDIOCRE MONITORING

By Greg McHale
CTO & Co-Founder of Datanomix

When machine monitoring systems first came about, the design philosophy was to blend machine data and human data to create a full picture of production performance. Collecting machine data, at least at the frequency and granularity that became available with modern standards, was new, and there was a learning and development curve around just how much could be gleaned from this data alone. First-gen solution providers asked, "Why not augment the data with human input to build the best possible picture?" On the surface, this seems reasonable.

DATANOMIX CO–FOUNDERS
Greg & John

The design flaws here manifest in a few ways, and not all of them are obvious. **When John Joseph and I started Datanomix, we actually spent many days on the shop floors of various companies who were using first generation monitoring systems.** It is only through this process, and the war stories of early adopters of monitoring technology, that the flaws of that approach come to light.

First, let's start with the objective of someone purchasing a monitoring system. The obvious goal is a desire to increase productivity and efficiency. The question is, "How do you plan on measuring this?" For most people, the basic assumption is that you care about utilization, and every monitoring system on the planet helps you understand utilization.

Let's presume your monitoring system is in place, and congratulations, you now know your utilization is 42%. That metric is completely context free since you have no way of knowing if 42% is good or bad for the type of work that you do, and the no-context problem gets worse when you average this stat across all of your jobs and assets. So if your utilization is 42%, and you feel like it should be higher, what are you going to do about it?

This is the first flaw of most first-generation production monitoring systems: **Utilization is an interesting metric, but not an actionable one.** So the traditional fix for first-gen systems has been to augment that with human input, often in the form of reason codes. Let's also pretend you have great compliance on reason code entry *(hint: almost nobody does)*, and let's pretend you have great compliance on reason code accuracy *(hint hint: this is the biggest disappointment we uncover when have discussions about first-gen monitoring systems at trade shows)*.

FLAW #1
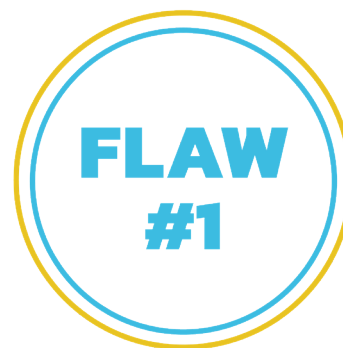
UTILIZATION IS NOT AN ACTIONABLE METRIC

Assuming you had very good reason code entry rates, and very good reason code accuracy, your data would look something like this:

42% utilization, 58% downtime

- 10-15% downtime - no reason
- 10-15% downtime - in setup
- 5-10% downtime - break/lunch
- 5-10% downtime - maintenance issue
- 5-10% downtime - tool changes
- 5-10% downtime - chip clearing
- 5-10% downtime - no job
- 5-10% downtime - no operator
- 5-10% downtime - measuring parts
- 3-5% downtime - engineering issue
- 3-5% downtime - can't find tools

Great. We have all this data now, so which knobs are we going to turn? That "no reason" area is the big one, so let's see if we can dig in to define the reasons. Hmm, all that did was spread that category out across the other categories, which are really close in size and vary depending on the week or the job being run. We have a blend of tooling issues, material issues, machine issues, people issues, and engineering issues.

See the problem? Pretty much all of these reasons are expected or normal in the course of doing complex milling operations—you can't take steps away that are part of what you are supposed to do. And unless you have an insanely disorganized tool room, or very poorly maintained machines (something you already know if true), then you are subject to the second major flaw of most monitoring systems: **the nuggets you are hoping for simply don't exist in reason code data. Most of the reasons are natural variance in the hardest parts of the process**.

FLAW #2
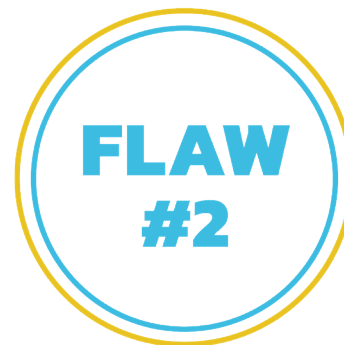
THE INSIGHTS YOU ARE HOPING FOR SIMPLY DON'T EXIST IN REASON CODE DATA

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Think about it—the most likely result is a blend of reasons in the aforementioned categories that vary by job/machine/operator. You may learn tool changes take longer than you thought, tools break more than you realized, setups are as variable as you suspected, and then manually go back and update your standards. This is time consuming, cumbersome work that requires a full analysis, reconciliation, and manual update for every single part number you manufacture. Most companies don't really do this. They just Pareto reasons generically across machines and their data looks very similar to what we showed above. Interesting to know, not particularly insightful, and likely not actionable.

Even worse, the third major flaw of most monitoring systems rears its ugly head here: **the vast majority of companies lose reason code compliance and accuracy in 45 days or less**, so their data isn't even as "good" as our example. This is the most common story we hear with first-gen monitoring systems, and the one that candidly, breaks people. You invested serious sums of money to get your fancy new system, you trained your operators for days or weeks, you started collecting the data and very quickly learned it wasn't valuable enough to extract insights from, and you're already having a hard enough time just getting people to use it at the level required for simple data collection.

FLAW #3
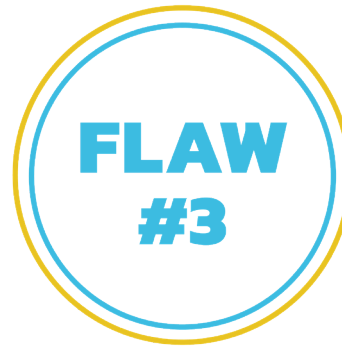
REASON CODE COMPLIANCE AND ACCURACY ARE LOST IN 45 DAYS OR LESS

At PMTS, Eastec, and Southtec this year, I personally spoke with over two dozen companies that were using first-generation monitoring systems and were unhappy with them. My initial question to them was, "what's your most popular reason code?" The most common answers:

- "Whichever one let's the operator get back to work the fastest"

- "The first one in the drop-down"

- "The button on the tablet closest to the X"

It's no wonder most people give up on their monitoring systems at this point—the cost/benefit equation is completely upside down when you think about how much of your effort and energy is required to try to make the data useful. You now feel like you're fighting a losing battle on compliance and all you really know so far is that your utilization is 42%. This feels a long way from the promise of deep insights into production.

We now find ourselves in the following conundrum—our utilization data is interesting but not actionable, reason codes didn't quite pan out, and people aren't really entering them consistently or properly anyways. So how are we going to get better data? This is where we come to the slippery slope of first-gen monitoring systems, and what we consider to be the greatest flaw of all:

FLAW #4

LACK OF USEFUL DATA CAN ONLY BE SOLVED BY MORE WORK AND INPUT ON YOUR PART
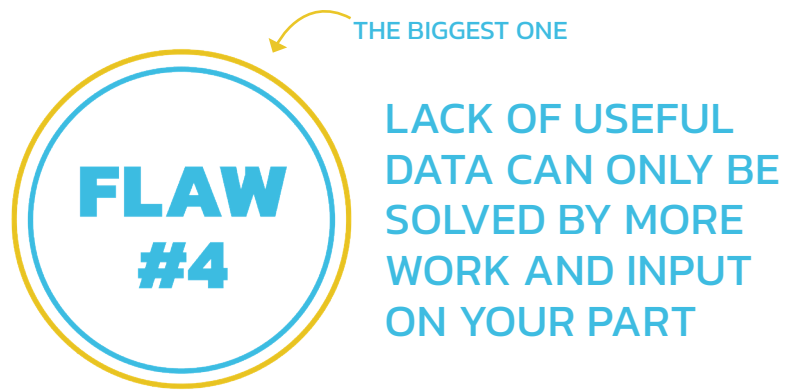
first-gen monitoring solution providers believe your lack of useful data can be solved by more human input and more work on your part.

These systems push the burden to your side of the ledger and ask you to do more work to make the data meaningful. If only you logged into each job, uploaded standards for those jobs, went through a painful ERP integration to tie job data to machine data, and had someone dedicated to slice and dice the reports properly all the time, you'd get those insights you were after. Unfortunately, this is why most people who have tried and failed with a first-generation monitoring system feel like they have nowhere to turn for help.

When first-gen monitoring systems don't deliver on their basic promise, the last thing you want to do is invest more time, more people, and more technology into understanding your production performance. As one recently installed customer of ours said:

> *"The flaw with every other monitoring system out there—and trust me I know, I've tried 4 of them—is me and my guys have to spend as much time running the monitoring system as running our machines themselves."*

Rest Assured—It Doesn't Have to Be Like This

Datanomix coined the phrase **Automated Production Intelligence** for a reason. These first-gen systems are far from automated and they fail to deliver on the promise of production intelligence in a way that factory leadership expects to receive it.

Lets contrast philosophies and tell you why we think Automated Production Intelligence is the superior approach and the next-generation of production monitoring.

First, automated means just that. **We require zero operator input whatsoever.** We don't need your jobs, we don't need your standards, and we don't need rhymes or reasons. We just need a connection to your machines.

From this connection, we begin to deliver the three foundations of Automated Production Intelligence:

1. Benchmarks and Scores
2. Meaningful Workflows
3. Business Implications

NO OPERATOR INPUT

Benchmarks and Scores

Once Datanomix connects to your machines, our software automatically learns what good production looks like for each and every part number you manufacture. Visualized below, this very simply is a performance standard our software derives using just the data from your controllers. It consists of an expected cycle time (machining time + touch time), utilization, and rate of part production for the specific job you are running. And we always have to say it twice, but **you don't have to tell us anything for the software to derive these standards—it does it 100% on its own.** The standards will be aggressive—at the high end of your performance envelope—but achievable, because we've seen you hit them.

We then score your jobs compared to those standards with a very simple system: A+ to C-. A jobs are on track, B jobs are a little behind, and C jobs are way off. Here's the best part: because you have a standard that is aggressive and derived from the data, and because you have a system intelligent enough to understand when you are performing well or when you are performing poorly, **instead of focusing on data entry, you simply respond to your lowest scoring jobs** to increase performance each and every day.

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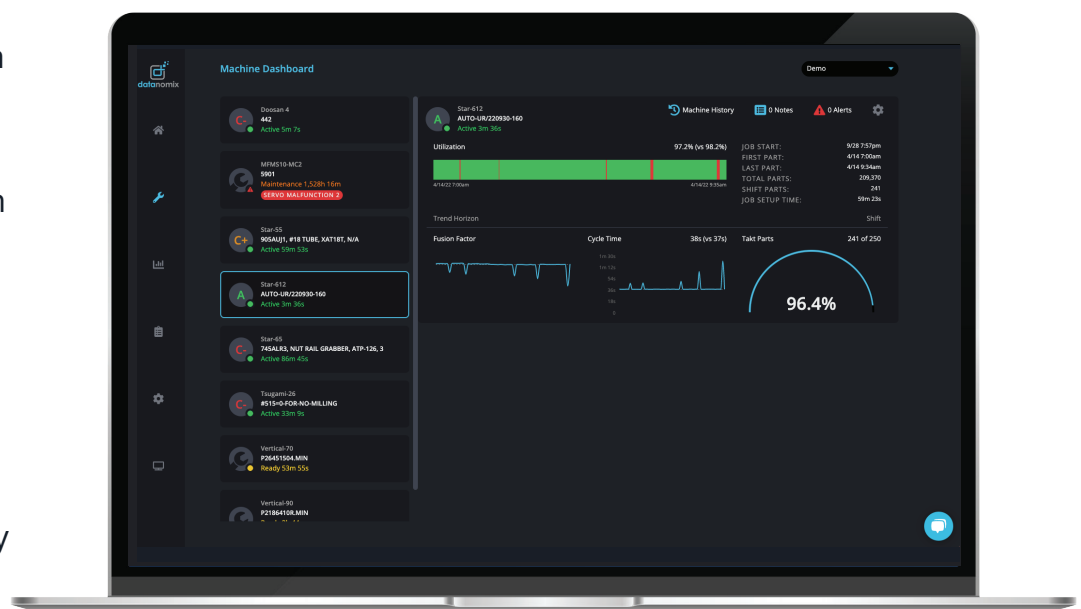
Think about it—Datanomix gives you a good standard tied to each job, and gives you a score to serve as a guidance system of where to pay attention. That standard is derived from everything that "normally" happens when you make parts for that job: cutting time, touch time, alarm patterns, utilization patterns, chip clearing, door opens, part measurements, you name it. And because it knows what is "normal," the score is an expression of variance—something is not running as it should be—on that specific job. **You don't have to wait for reason codes to be collected and you don't need operators augmenting data.** You simply respond to poor scores with your best people and watch as communication thrives, problems get solved, and productivity increases.

Establish Meaningful Workflows

Datanomix establishes standards on your behalf, scores every job, and keeps all of your data forever. That opens the door to a lot of opportunities to get you the right information in the right context and at the right time.

Want to get this great information out on the shop floor so people can immediately respond to the challenges of driving higher performance? **Datanomix TV Mode** is often the first way our customers deploy Datanomix, hanging large-screen TVs around the shop arranged by team/cell/ area for everyone to see and understand— "what's the score?"

OPERATORS AT A RECENT INSTALLATION GATHER AROUND TO SEE REAL–TIME PRODUCTION SCORES PRESENTED BY DATANOMIX TV MODE JUST HOURS AFTER THEIR MACHINES WERE CONNECTED.

Tired of chasing production information for the first 90 minutes of your day so you have a prayer of maybe solving problems in your morning production meetings? Our **Coffee Cup Report** exists to automate the pain points of data gathering for you. E-mailed at 6:00 AM every morning, the Coffee Cup Report serves as a full scorecard of everything that happened on the prior day so you know exactly where every job stands. Better yet, it offers interactive click-throughs so you can visualize and discuss yesterday's job performance during your morning meeting, and prioritize, problem solve, and adjust based on real data.
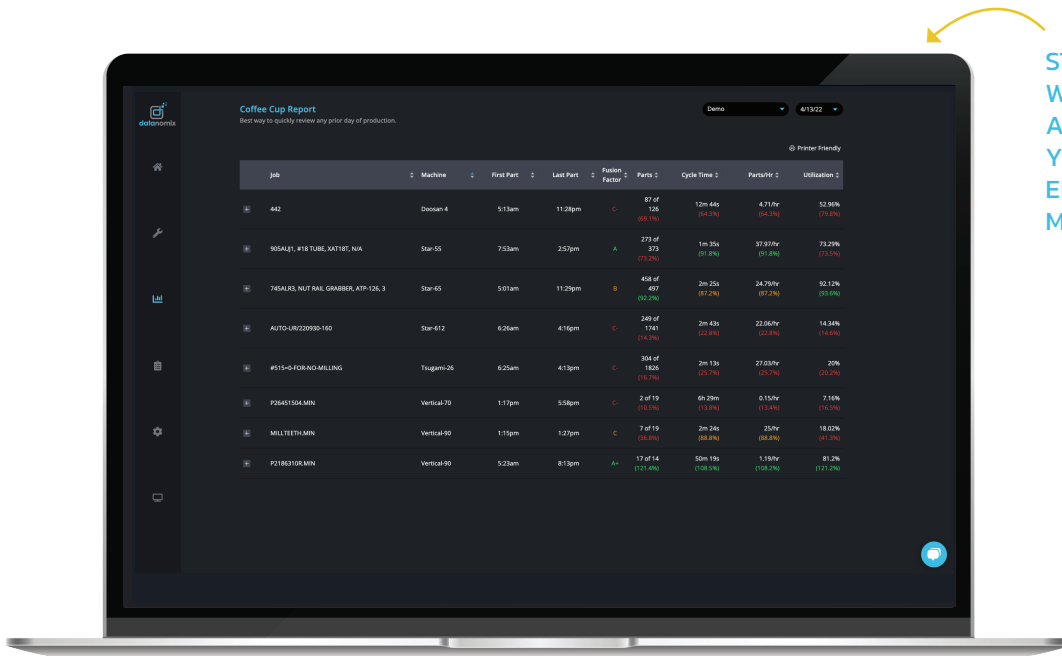
START YOUR DAY OFF RIGHT WITH THE COFFEE CUP REPORT, AN EXECUTIVE SUMMARY OF YESTERDAY'S PRODUCTION EMAILED TO YOUR TEAM EVERY MORNING AT 6:00 AM.

"In 15 minutes each day, the Coffee Cup Report gives me a complete picture of yesterday's results without having to walk the floor or counting parts. It's automatic, with no disruption to operators, and I have the answers I need to run the business."

Jesse Bunnell
Plant Operations Manager
Eptam Precision, Northfield, NH

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Great Data Drives Business Impact

In one of our most popular reports, **meaningful workflows meet business impact**. Think about the idea of a.) data-derived standards for every job you run, and b.) historical performance indicators that show you exactly how you perform and with what degree of consistency. Now imagine that data in a format that integrates your shop rate and gives you quoting guidance, setup guidance, and continuous improvement guidance based on your real performance.

Imagine no more. Our **Quote Calibration Report** is a game-changer for every single manufacturer. Blind no more to your real performance, you get quoting guidance that allows you to protect your profits since you know your real cycle times, real cutting times, real setup times, and real typical day and shift performance by part number. And with Datanomix automatically analyzing your consistency across jobs, you have a curated list of your greatest continuous improvement opportunities, with clear visuals to show you good days vs. bad days so you can see exactly what to dial in and what holds you back.

> *"As we build more data on different parts and jobs, the information that the Quote Calibration Report provides on our actual cost per part against the benchmark shows us opportunities for improvement, as well as insights into how we can improve our job quoting."*

Aaron Springer
Vice President, TW Springer, Landenberg, PA
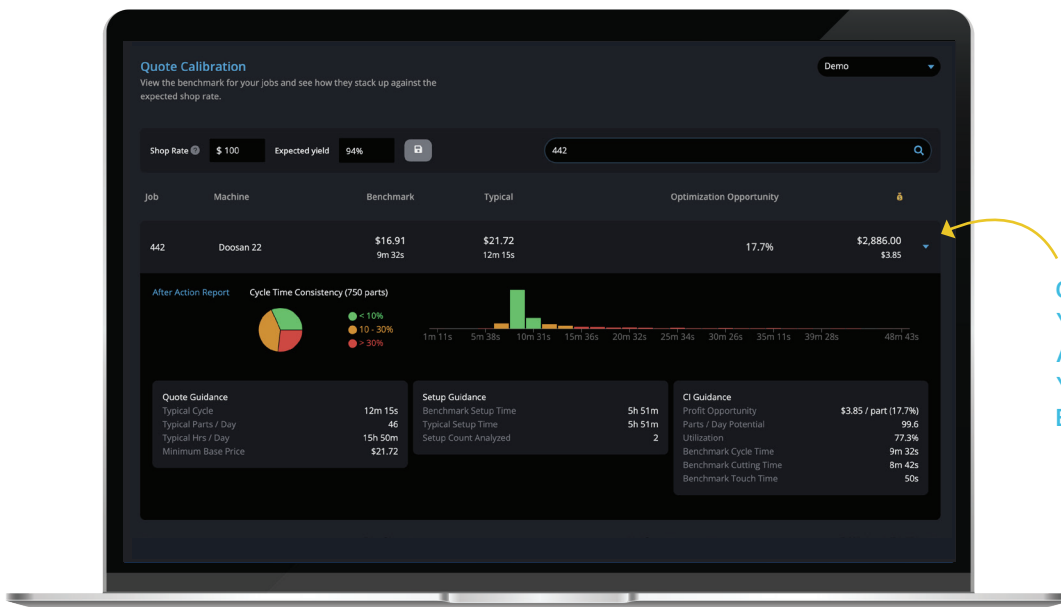
CLEARLY UNDERSTAND WHERE YOU NEED TO QUOTE BETTER, AND WHERE YOU NEED FOCUS YOUR CONTINUOUS IMPROVEMENT EFFORTS.

Get More Insights with None of the Flaws

If you're considering a monitoring system for the first time, or have been burned by systems that require lots of work on your part to make sense of the data, rest assured there are much better ways to take advantage of the data from your machines. Our company was founded on the premise that **manufacturing people don't need another job, they need a job done for them.** You need a monitoring system that requires virtually no effort on your part, contextualizes data in a way you can act on it, and comes pre-built with reports out of the box that are designed to deliver meaningful impact throughout your day.

We're not just a software provider. We're a partner that is here to help you get the insights you need to protect your profits, harvest additional gains, and motivate your people. We have case studies for literally every kind of operation out there—milling, turning, aerospace, defense, industrial, medical, lights out, palletized systems, robotic systems, the whole gamut—and we'd love to help you next.

Don't wait! Contact Datanomix today at sales@datanomix.io or 866.488.4369.

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SCAN TO SEE OUR CUSTOMER STORIES

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dc

M&H Engineering

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