



MANUFACTURING MANAGEMENT

Incorporating Works Management

PEOPLE PROCESS PLANT



BUDGET VERDICT



Do the numbers add up for manufacturing?

06 Round-Up

The key news from our industry

14 Make UK Conference

Who said what?

20 Show Preview

What's coming up at MACH 2024?

30 Human Factors

Understanding your workforce's skills

41 Automation

Five trends in automation for 2024

THE HUMAN FACTOR

When to use automation - and when not to - is critical in manufacturing. Knowing your workforce and the full range of the job they do, is crucial.

BY **DAVID GRIFFIN**, PRINCIPAL CONSULTANT AT 42 TECHNOLOGY (42T).

It seems obvious not to mess with things that you don't fully understand. For instance, you wouldn't pull out a car part without first knowing its purpose, would you? And yet every day, some highly educated people do something very similar to this but in their own area of work. For example, online service wizards sometimes tweak features thereby alienating loyal users while chasing after new ones who don't actually use their service. Thriving companies merge and end up damaging what made them successful because they never grasped their own company culture, or what made their company successful in the first place.

Other examples include the way in which new tech in aircraft eliminates subtle user feedback modes (smell, vibrations) that were never really documented. Virtual doctors' consultations limit their diagnostic skills - built up over years - that would otherwise pick up on subtle signs (gait, tremors, itching) that aid their ability.

Human Insights vs Automation

In a similar fashion, a few years back a client said they wanted to automate what seemed like a 'simple' assembly job done by an assembly worker. The conversation went something like: "He puts a Part A into the jig, then puts Part B

into the jig then...".

I interrupted and suggested that in fact, he may have left something out. "I think you mean that he takes Part A, visually inspects it, then puts it into the jig?"

The client was initially dismissive. "There's no inspection involved," he assured me.

"So if Part A is clearly faulty, your chap would use it anyway?" I said. After a pause, the client slowly nodded. Then we took a step back and started again. It turns out, this process couldn't be replicated by a machine and the automation to replace the worker when all aspects were taken into account, couldn't be justified.

Firstly, the upstream parts of the process needed to be made so good that his assembly job no longer needed a brilliant thing called a human to do it, and that involved a lot of investment when the predicted product life was not that long.

Worker's Unconscious Expertise

A human is actually quite astonishing. They check things they're not asked to, spot anomalies no one expects, and they prevent chaos when standard procedures fail, especially if the official version was documented by someone who doesn't spend their day where the process actually happens. Any veteran in any field can tell you their own version of this story.

To illustrate this point,



Lean Manufacturing has a term called Gemba, derived from the Japanese meaning of 'the real place'. When we 'go to Gemba', it means we are going to the real place where work happens: the shop floor, the hospital ward or factory floor. There's a humility implied in this humbling journey - it may turn out that everything you think you know might be wrong.

The system you do see in action may not match the official version, and that's thanks to humans, the glue holding it all together. Oddly enough, those workers at the coal face might not fully understand how things work either. They rely on intuition, encode learning into habits and language, and mostly do it all unconsciously.

Automation Blind Spots

In one of 42T's recent projects, we were asked to investigate why a personal care product (consisting of a dispenser and a consumable) was experiencing failures in the field that were





inexplicable given the design tolerances.

A factory visit and detailed examination of its workflow revealed that operators had discovered a manufacturing shortcut which resulted in higher material utilisation and easier inspection. But occasionally this approach led to product that was not to drawing, yet in a way that was not picked up by the installed inspection sensors either. Engineering management were unaware of the shortcut, and hence were unlikely to identify the root cause of the field failures.

So to truly understand a manufacturing process, you can't just ask; you need to invest time and resources in uncovering where reality diverges from the manual. Don't tinker blindly. Respect the parts you don't comprehend. Automating these areas should be your last resort, not the first, because:

- These are typically the blind spots in any organisation
- They're complex tasks that aren't easily replaceable by machine or algorithm
- They might be what keeps your workforce workers interested, engaged and motivated

Outside Perspectives

If you want to understand what really goes on and why things usually work, you'll need to do more than just ask the person doing it. You will need to understand all the places where the real version of how things work deviates from

the official version, and the reasons why. They will be the places where a human being really adds the most value.

To give another example of this from the construction sector, it was found that cranes in a steelworks occasionally dropped 60 tonne steel slabs (with catastrophic safety implications). Operators in one location were adamant that a certain (older) design of lifting tongs was safer, but they were initially doubted because they seemed to suffer more incidents at their site than operators in other locations.

However, a period of onsite monitoring revealed that the first operator group actually experienced far higher traffic

42T

is a leading product innovation and technology company

and that their "drops per lift" were lower. Furthermore, careful examination of the lifting tong geometry revealed that the older tongs did indeed offer superior grip force and the operator instinct was correct. The company agreed to convert all tongs to the preferred geometry, resulting in elimination of the drop risk.

Understand First

In almost all cases when diagnosing manufacturing issues or looking for efficiency improvements, it can help to bring in an outsider with no preconceptions who can observe and ask the questions your organisation may not know to ask. To do otherwise is to risk the most damage by tinkering with things not fully understood.

In short: first understand how something works and only then consider optimising or automating it.

Or to paraphrase Bob Dylan, "Don't try to re-engineer what you can't understand." 