The genesis for this column came several years ago when I visited a supplier in Southeast Asia to audit its capabilities for a new product. My host walked me through the small work cell. It was well-organized, the processes well-documented.

Leaving the work cell, I saw operators coming off of a tea break. They were exchanging pleasantries and gossip as they waited for their high-volume production line to restart. Their numbers surprised me. My host explained that some types of automation had been disabled after transfer from the United States. It was less expensive to run the line with more people and less automation.

In manufacturing, the thought of disabling automation is an anathema. For years, automation literature has extolled the coming of a factory so automated that it operates without workers or lights.

I saw this in the 1990s, when I worked on projects that employed increasingly high levels of automation and data collection. These manufacturing lines produced hundreds of thousands of units per month. The underlying assumption was that automation “is the most effective form of production ... especially in the days when everything is getting smaller, cheaper and faster,” according to Patrick Waurzyniak in the July 2007 issue of Manufacturing Engineering.

And it was. When forecasts were accurate and the manufacturing lines were up, they were a sight to behold. And their efficiencies of scale made them virtual money machines.

Unfortunately, forecasts aren’t always accurate and highly automated manufacturing lines are not always up. That idled millions of dollars in capital, not to mention years of toil adjusting limit switches or sensors and troubleshooting programmable logic controller ladder logic.

Automation is wonderful when it works, but it can be a nightmare when it doesn’t. Automation needs to be adopted with eyes wide open. Rick and Chris Harris, in the August 2008 Manufacturing Engineering, wrote that while automation is important, engineers must ask what must be automated and what does not have to be automated.

Sometimes tight tolerances demand a pick-and-place application for assembly, or quality requires machine vision, but the application of automation should be thoughtful and prudent. The challenge for most engineers is not how to automate but when not to. As Rick and Chris Harris wrote: “There is a great divide between level three (automation of individual process) and level four (automation of material loading). This divide represents MONEY in the form of maintenance costs, engineering costs, costs of the machine, etc. When making the jump to level four automation, where the machine is automatically loaded, automatically cycled, automatically unloaded, and manually transferred, cost often increases while flexibility can decrease.”

My Southeast Asian supplier was disabling level four automation. Retain mission critical automation, but carefully scrutinize automation required to smooth material flow, improve theoretical line balancing or collect data. Unnecessary automation ties up capital and reduces line flexibility. In fact, the highly automated lines of the 1990s did not run if the data collection system was down.

Projects in this millennium focus on islands of automation that guarantee mission critical tolerances. Efficiencies are not as high, but increased flexibility reduces downtime. Reduced automation of material handling systems means capital investment can be made incrementally and by manufacturing zone. Uptime is increased, but the vision of dark factories bereft of operators (or tea breaks) is a thing of the past.

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