IoT SPECIAL

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IoROT—Internet of Really Old Things

By Ashe Menon, SVP of Global Manufacturing, National Oilwell Varco

Though much of the focus around the IoT has been on new equipment and plants, a majority of the manufacturing facilities in this country still have extremely old equipment. This is even more pronounced in the oil and gas industry, which is in the midst of a downturn that's currently been going on for almost three years. It is becoming increasingly difficult to access capital in times like these, meaning it is imperative that we do more with less - less money, fewer people, and definitely less "new technology."

In the event that we do spend money it is for one of several primary purposes: we spend either to help us save/make money or to help our customers save/make money. Unless there is a compelling correlation between spending money and one of those outcomes, the likelihood that a new project will be green lighted is exceedingly low.

The main problem is that the equipment in many of our facilities not only predates the internet, but in some cases, predates the personal computer. A lot of our assets have been in place since the 1970s and some have been there since the 1950s; the capital cost for replacement of such equipment is in the millions. Maintenance and reliability teams at manufacturing plants across the country have done an outstanding job of moving from a purely reactionary maintenance program to a more proactive program, but heavy rotating equipment and forging machines generally don't age well regardless of their maintenance plan. This means that there is a pervasive need for sensors and systems to help us stay ahead of the P-F Curve. Without getting into a lot of detail about what the P-F Curve is, we essentially want to be able to know, in advance, that a piece of equipment is going to go down. Anyone who has worked in a plant or with heavy equipment knows that the equipment will break down; the key is to know what will happen ahead of time, so we can have the people, plans, and parts available to bring the equipment back up to the operational condition in the shortest amount of time.

> "There needs to be an understanding that there isn't an "easy button" to just make IoT work"

On paper, this sounds like the perfect setting for sensor and software vendors to talk about possible solutions to alleviate this challenging problem. Unfortunately, there is an inherent problem with these solutions, and it is the bane of IoT providers for older plants—false alarms. If an oil-analysis sensor or vibration sensor working in tandem with a machine-learning algorithm sends out an alarm, the person on the receiving end of the system has to make the call to either take that machine down or keep it running. It might seem like common sense to take that machine down for an inspection or repair, but if it is an asset that is critical to a $2,000-a-minute operation, it is important for that alarm to be correct. If the notification is a high-probability "supervised" alert from the machine-learning system behind the scenes, it could be a non-issue; if it is an "unsupervised" alert because something new or different is running, the call comes back to the person receiving the message. If that person makes the call to shut down the machine and it turns out that it could have run for another six months without any problem, the financial repercussions of that action could be immense but most importantly, the trust in the system goes away.

Ashe Menon

This is not to say that we cannot put these systems in place; quite the contrary, there is a distinct need for such systems, but also a level of learning and organizational competency that must be achieved before the systems can be properly implemented. There needs to be an understanding that there isn't an "easy button" to just make IoT work, and suppliers and vendors have to recognize that IoT contains a massive and complicated combination of sensors, PLCs, old equipment without PLCs, old equipment with obsoleted software, new software, and new ERP systems. This typically opens the door to software integration companies, and as such projects are generally quite expensive, the question invariably comes back to, "How should I spend my money in this cost environment?" Companies typically start IoT projects as pilot projects or proof of concepts, and while this is a great way to "dip your toes in," the real ROI only happens when there is a large-scale implementation.

For IoT to be successful in older plants and manufacturing facilities, companies have to adopt something akin to the Capability Maturity Model (CMM) in the software industry, similar in the fact that it has levels of maturity but maturity measured as an organization's readiness to accept IoT projects and render them successful: CMM for IoT, that is, or an IoT MM. Unless the culture in the organization is ready to accept the level of change, frustration, and failures that come with such significant projects, they would be better holding off on starting such an endeavor or risk having statements like, "That will never work, we have tried that before," being used at the very mention of IoT.