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Robots are terrific and have a place in all our operations. While they may be the informal poster for automation, they are far from the place to start. There are many misconceptions about what it means to automate and rightful fear of those looking from the outside – in that jumping to robots before there is a foundation in place is risky business.

What we intend to discuss are some of the ways that we view and monitor our shops to identify process weaknesses along with some of the tools that can be used to address them. These tools provide substantial gains in and of themselves and prepare for straighter forward robotics when the time comes.

Before robotics the groundwork we propose is:

- Automated data collection and analysis to enhance communication and reduce noise
- Identification and reduction of tasks that are not optimized for humans

Deployment of expert and closed loop control systems

- Automating both machine data collection and the codification of knowledge then further automating the analysis and distribution of this allows for gains such as:

- Automated tasking to the floor – **so fewer people can do more, better, faster, with less disruption**

- Action prompts to operations – **so less time is spent looking for problems and more is spent designing solutions**

- Process data direct to engineering – **so the RIGHT information to solve the problem is available IMMEDIATELY for better outcomes**

- Consumption data to purchasing – **to avoid stockouts without ballooning inventory**

- Capex and Savings data to management – **to help make the right decisions for growth**

Repetitive computational and data processing tasks are not what we were put here for, and in fact Humans are no more than 90% effective at basic math and data entry (group demonstration). With this understanding we can approach some of the biggest offenders in various ways.

Expert and Closed Loop Control systems allow us to codify our process knowledge and enforce it on a process. We will discuss some of these systems that can help:

- . Uniformly enforce process rules to remove shift or individual performance variation.
- . Increase response times to reduce negative event outcomes by an order of magnitude
- . Keep a process in control through variations in incoming materials and tooling.

Ultimately this path builds a foundation for robotics and advances the goal of making better jobs for the fewer people that are available to us.