

Process Engineering

1. Map the Process

- Break machine into systems or stations
- For each station identify the inputs and outputs
 - Identify control points (CP) from inputs
 - Identify critical control points (CCP) from list of CP
 - Support CCP with PM and calibration as necessary
- The output of the first station should be the input of the next, and so on

2. Document the process

- Document all process settings
 - includes variable and attribute conditions
- If process is acceptable and stable consider as "last known good"
 - "bread crumbs" for "the way back"
- Consider visual ways to identify CP as "normal". Example: Green marker where needle should be, "Default" sticker if switch, button etc is typically in "Up" position, etc.
- Photos are quick, easy and useful.

3. Develop procedures

- Start Up (SU)
 - Walk around check list
 - Operations
 - Maintenance and cleaning
 - QC
 - Training
 - 5S or other visual mgt techniques
 - Shut down
 - Link to DCO

4. Process Monitoring

- Line Clearance
 - Review setups. Focus on ccp.
 - More bread crumbs
 - Event Log
 - Record any non-standard process change or unusual observation. Question legitimacy of any change.
 - Check sheets/Walk Arouns
 - Control key inputs
 - Book of Knowledge
 - Annotated control charts
 - Need robust metrics system to evaluate inputs and outputs
 - Operating rate
 - OEE: Capture Big Three detractors
 - Down time
 - Quality losses
 - Control chart metrics
- QCDS
- Improve Quality
 - Reduce Cost
 - Assure planned Delivery
 - Reduce crew stress & fatigue
 - Present a Safe work environment

5. Change Control

- Swiss army knife
 - Control Charts
- Advanced technique
 - MVA
 - DOE
 - DMAIC
- Process improvement
- Need to distinguish between major minor changes
 - If substitution is identical replacement, most likely minor
 - Any change supporting ccp is major
- Equipment change notice (ECN). Document changes to equipment
 - Link to predictive maint program
 - Link to DCO