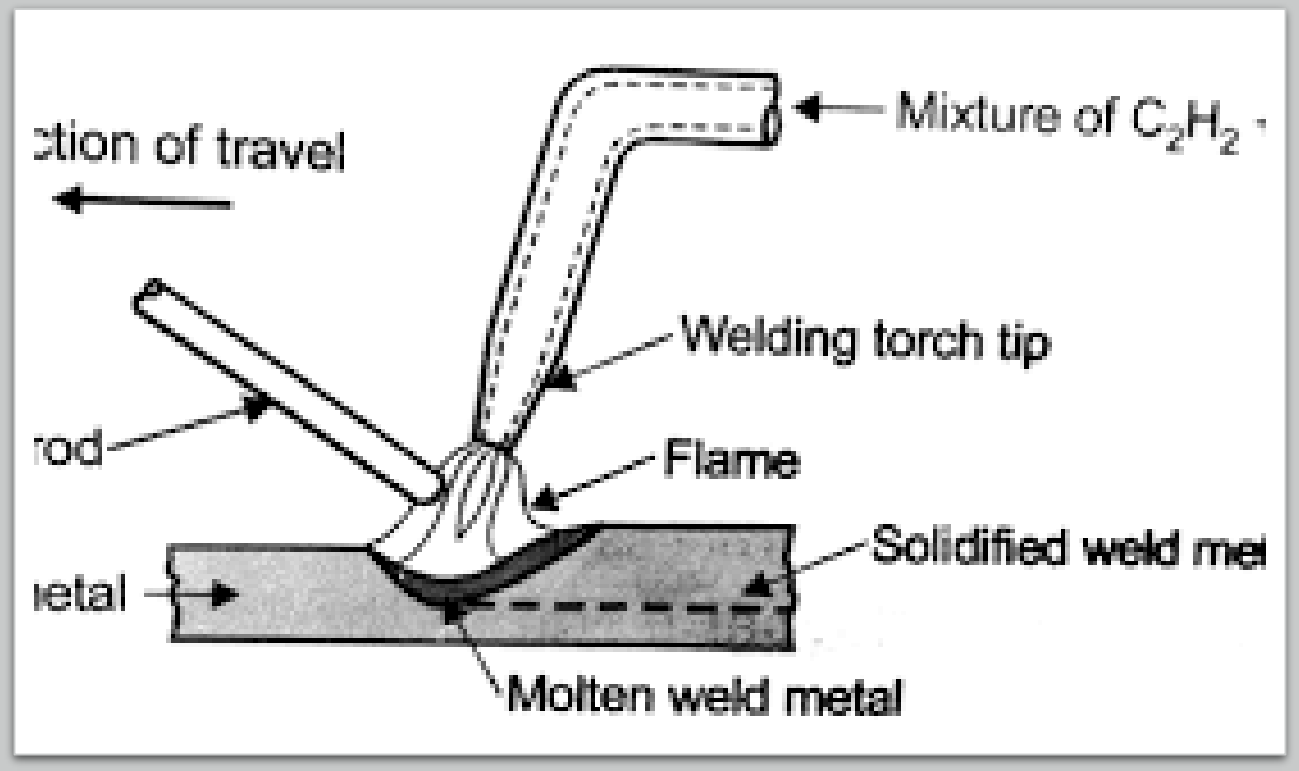
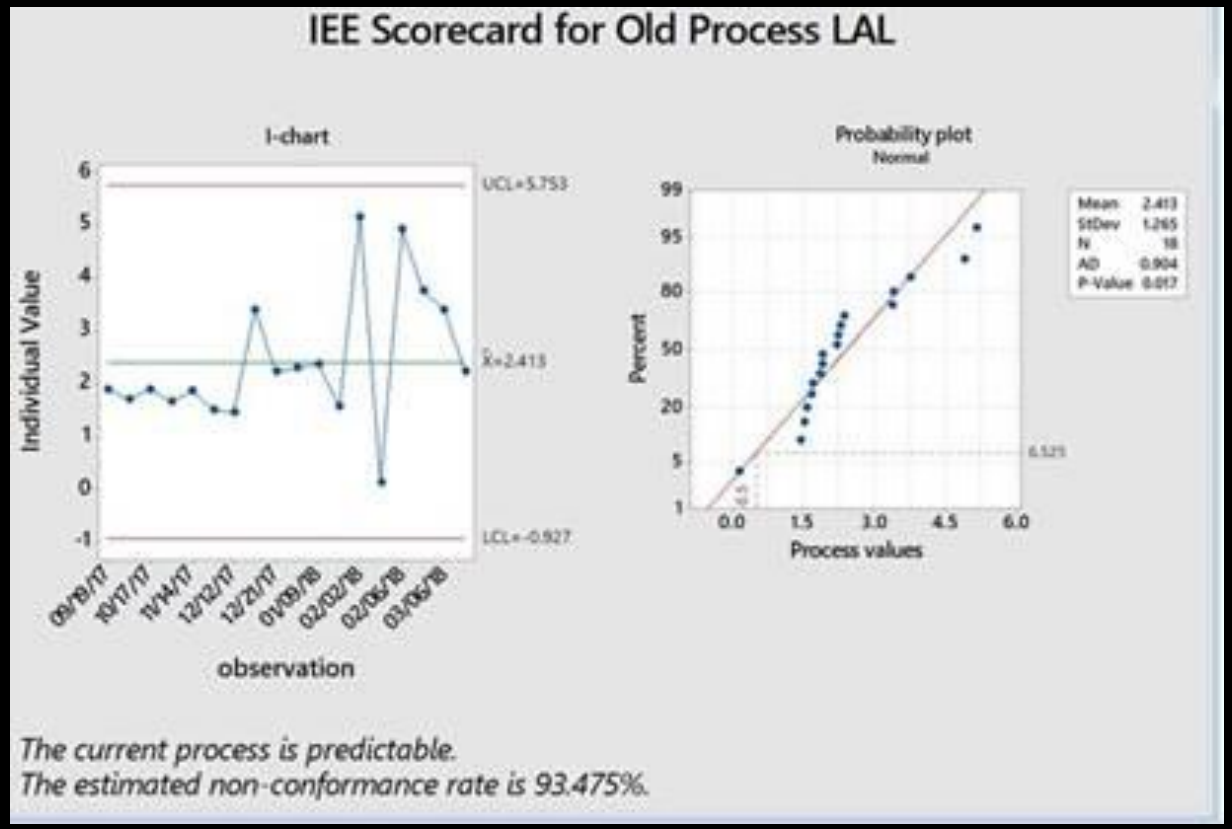
Case 3: Robotic Welding Process

Robotic Welding Process

Issues

- **93.4% out of specification**
  - **High rate of engineering review and deviation allowances causing poor on-time delivery issues product**
- **Stable Process**
  - **Machine operation stable & capable (machine process variables) per SPC**
- **High scrap rate at next assembly process, tolerance stack up issue**

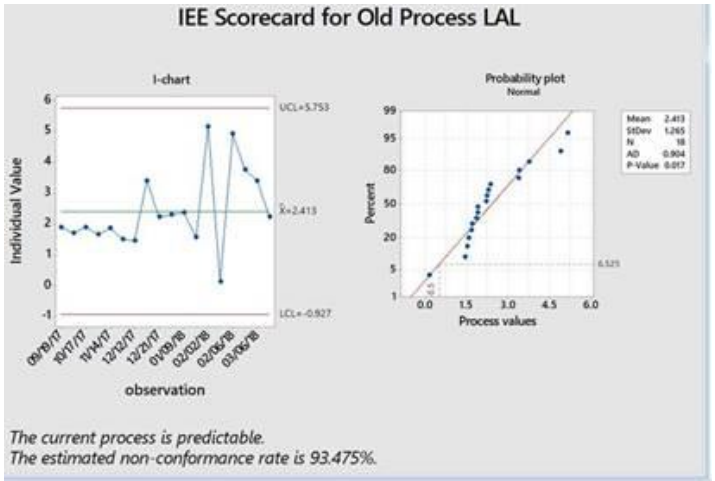


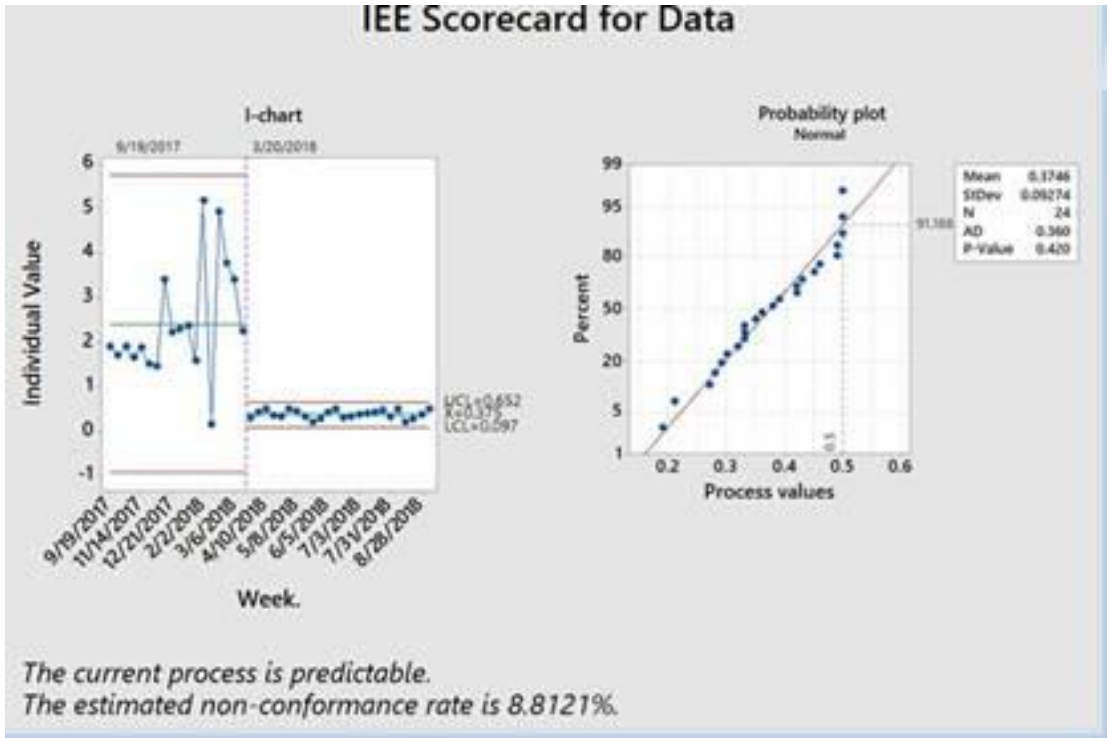

IEE Scorecard for Old Process LAL
I-chart
Individual Value
UCL=5.753
X̄=2.413
LCL=-0.927
observation
Probability plot
Normal
Percent
Process values
Mean 2.413
StDev 1.265
N 18
AD 0.904
P-Value 0.017
The current process is predictable.
The estimated non-conformance rate is 93.475%.

OLD process

Robotic Welding Process

- Improvements
  - Review of incoming TIG wire…..5 /WHYS
    - SPC of Rod diameter revealed out or control characteristics
    - Vendor change + tooling to continuously measure wire diameter
  - Reviewed Maintenance logs
    - Maintenance correctly undertaken but “used” oil had unusual low viscosity, SPC of 6 months viscosity post maintenance revealed out of control condition
    - Oil grade change
    - Increase rate of oil change
  - Stable Process
    - Implemented process stoppage if variability of feed wire fell outside of control limits


IEE Scorecard for Old Process LAL
I-chart
Individual Value
UCL=5.753
X̄=2.413
LCL=-0.927
observation
Probability plot
Normal
Percent
Process values
Mean 2.413
StDev 1.265
N 18
AD 0.904
P-Value 0.017
The current process is predictable.
The estimated non-conformance rate is 93.475%.


IEE Scorecard for Data
I-chart
Individual Value
9/19/2017
3/20/2018
Week.
Probability plot
Normal
Percent
Process values
Mean 0.3746
StDev 0.09274
N 24
AD 0.360
P-Value 0.420
The current process is predictable.
The estimated non-conformance rate is 8.8121%.

Results

- Yield increased to 92+%
- On-time delivery improved from 67% to 89%
- Process/line stoppage
  - 1st month 67 events per month
  - Post 3 month 7 events per month
- Engineering disposition of out-specification material reduced to 1-2/month
- Scrap cost reduced by $97,000, leaving only cosmetic issues to be solved