The Cure for the Cargo Cult

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What is a Cargo Cult?

- **WWII S. Pacific**: Islanders prayed, food box came!
- Jumped into the programming lexicon
- Happens ever more in engineering
- **PUT IT IN AND DON’T ASK WHY**
The Background

- Scrubber System
- Trusted, established supplier
- Many small changes, including feed, layout
- The assumptions didn’t work this time
- Weeks of redo and thousands of dollars
- Overall success
Different type of customer, construction, and gas

Impact

- Dosing rates changed
- Multiple recalibrations of pH/ORP + Alkalinity
- Poor meter rangeability and replacement
- Replacements could not arrive on time
- Logic reviewed repeatedly
- New and iterative managerial processes
- New set of reassembly instructions
Normal Accidents

• Complex, tight coupling, catastrophic potential
• Accident in spite of all in spec
• This Scrubber was a mini example
• Large examples:
  • **Operations**: Three Mile Island, Fukushima
  • **Project level**: Rolls-Royce RB211, S-Class
• Charles “Chic” Thompson, What A Great Idea!
• Rule #3: always look for the 2\textsuperscript{nd} answer
• Brave enough to fight: “It cannot be wrong!”
• Sakichi Toyoda’s “5 Whys”
  • Why did they choose that meter?
  • Were able to build a spool piece and rotameter with range reflected in programming
• Do not see micro and macro as contradictions
For Management, Remember the 10X Rule

- Begin with the End in Mind
  - I want the system to work

Source: http://www.cqeacademy.com/cqe-body-of-knowledge/quality-system/cost-of-quality/
Not taught, not encouraged, reductionist
  • Our education is not well integrated

The good thing: I&C&E already knows this
  • With instrumentation, you cannot see problems in isolation

Ownership drives the right attitude
  • Sign your name to the project

Know your limitations first, then work them
  • Do not be afraid to ask questions and do not assume

Have multiple disciplines at your disposal
Conclusion

• Not an optimum situation
• Will still require extra site work
• Prevented a lot of site work and trips
• Very thankful management on all sides
• OVERALL SUCCESS