High Performance Graphics for Improved Operator Interface

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Brent Maitland, UNI
Dave Howell, P.E. (Sega Inc.)
UNI’s Campus Utilities

• The UNI Power Plant generates steam and electrical power providing for lighting, heating and cooling for the main campus

• Four boilers with a total capacity of 345 kpph
  • Two gas and oil fired low pressure boilers
  • One pulverized coal fired boiler
  • One CFB boiler

• One 7.5MW extraction turbine
PROJECT: Replace Controls on Boiler 3 and Boiler 4

Replace obsolete controls and improve operation and maintenance

- Existing combination of DCS and pneumatic controls
- Very different platforms between boilers
- Difficult to maintain
- Limited availability of spares. Limited experienced technical support
PROJECT: Replace Controls on Boiler 3 and Boiler 4

- Improved control
- Benchboard removal and HMI upgrade
- Common platform
- Data visibility
- Improved maintenance
• Guiding documents
  ✓ *The High Performance HMI Handbook* by Hollifield, Oliver, Nimmo, and Habibi
  ✓ ISA101 – Human-Machine Interfaces
  ✓ ISA18.2 – Alarm Management

• Enhance operational awareness
  ✓ Low contrast depiction / Limited use of color
  ✓ Values are presented in context (information)
  ✓ Critical values included in embedded trends
  ✓ Alarm colors are reserved for only indicating alarms
  ✓ Hierarchy design
HP HMI
Interface Evolution

Benchboard

Faceplate

P&ID
Traditional HMI

High Contrast

Rainbow of colors!

Strain!

Distracting static elements
HP HMI

Benchboard

Operator Workstation
Going Gray in your 30s

• Added goals
  • Improve Operator Awareness
  • Resolve Color Conflict

• Implementation
  • Project Management Triangle
  • Fast, Good, Cheap
  • Too much, too soon
  • Door open for further adoption
• Blended solution
  ✓ P&ID with reduced color usage
  ✓ Hard-coded faceplates with reduced color
Project Solution

- Blended solution
  - Imbedded trends
  - Strong trends usage
    - Information bars....
Results

+ Success and satisfaction!
  ✓ Less distraction
  ✓ Easier to identify problems
  ✓ Easier to navigate
  ✓ Quicker to respond
  ✓ Improved information visibility
  ✓ Improved Control Room interaction
Things to Consider for Your Project

• You need a believer!
  • A collaborative team
• Scaled implementation
• Alarm Management is critical
• FAT and Training
• Operator adoption
  • Inertia  I HATE change!
  • P&IDs
  • Digital values
  • Trends