Commissioning the BCAG HOB

Boeing Commercial Airplane Group
Headquarters Office Building
Longacres Park  Renton, WA

Engineering Economics, Inc
Commissioning Team

- Boeing Facilities Staff
  PM, User Groups, Ops & Maintenance
- Engineering Economics, Inc.
  Commissioning Agent
- Baugh Construction
  General Contractor
- MacDonald - Miller
  Mechanical Contractor
- Cochran Electric
  Electrical Contractor
- The Bowlin Co.
  Controls Contractor
Commissioning Benefits

• Enhanced project communication and subtask scheduling
• Forum for problem resolution
• Continuity between design intent, plans and specs, installation and operation
• Documented installation, start-up & control of equipment and peripherals
Commissioning Benefits (cont’d)

- Quality assurance processes
- Functional testing and documentation of integrated systems performance
- Improved hand-off to facilities personnel
- Integration with in-house maintenance and asset tracking programs
Value of a 3rd Party Cx Agent

• Dedicated focus on Cx process to augment client and contractor staff
• Owner’s Representative throughout project
• Provide continuity between client, design, vendor and construction personnel
• Develop and administer functional tests
• Identify and organize documentation requirements
Contractor Cx Tasks

• Mechanical
  – Specified testing documentation
  – Start-up and controls duties
  – Functional testing participation
  – Controls subcontract

• Electrical
  – Specified testing documentation
  – Interbuilding communications
  – Fire alarm subcontract
Contractor Cx Tasks

- **General**
  - Construction task coordination w/ Cx tasks
  - Finalized documentation to CA

- **Controls**
  - Final control sequences w/ client staff
  - System as-builting and tune-up
  - Participation in functional testing
Contractor Cx Tasks

• Commissioning Agent
  – Write Cx Plan
  – Conduct weekly meetings
  – Construction process facilitation
  – Cx Site Observation reports
  – Write and administer functional performance tests during and after construction
  – Compile Cx Manual
CBM - Condition Based Maintenance

• What does CBM Team do?
  – Assess the existing condition of machinery by collecting, analyzing, and trending key parameter data with advanced technology equipment.

• Baseline
  – The first set of data collected
  – Compared to known standards
CBM - Discoveries & Solutions

- 40 Hp Air Handler Return Fan Motor
  - Leads shorted to ground, repaired motor
- 1 Hp Fan Coil Unit Motor
  - 20% resistive imbalance, replaced motor
- 7 1/2 Hp Motor Cooling Fan
  - Loose fan - tightened w/no damage
- 40 Hp Supply Fan, 5 Belt Drive
  - Belt resonance - avoid known speeds
CBM Functional Testing Tasks

- Power profiles of large motors w/ VFD’s
- Run up / coast down test for resonance checks
- Control signal calibration (% speed)
- Harmonics profiles
Future Suggestions

• Increased Cx focus during design phase
  – Full integration of customer design criteria w/ construction specs
  – Design review with controls and operations perspective
  – Detailed testing requirements in contract documents
Cx Services Provider

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