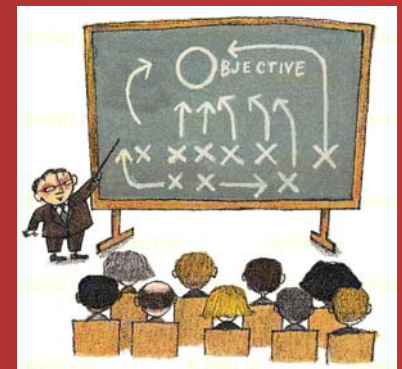


What Contractors Need to Know about LEED Commissioning & IAQ Management

Presented by Energy Ace, Inc.

Wayne Robertson, PE, CxA



What is Commissioning?

- Commissioning “is a systematic process of assuring that a building performs in accordance with the design intent and the Owner’s operational needs”
- Inspired by the Navy practice of a “shake down” cruise
- Simply stated, commissioning is making sure the building runs right



Why Commissioning?



- Reduces the Owner's Total Cost of Ownership
- Pays for itself with improved operations, avoided problems, and energy efficiency
- What Owner doesn't want reduced risk, fewer change orders, improved energy efficiency, & lower operating costs?
- What Architect or Contractor doesn't dream of a project with few or no problems and no call backs?

Benefits of Commissioning

- Energy Efficiency
- Good IAQ Management
- LEED™ - Basic Commissioning required. Additional (Enhanced) Commissioning earns one credit.



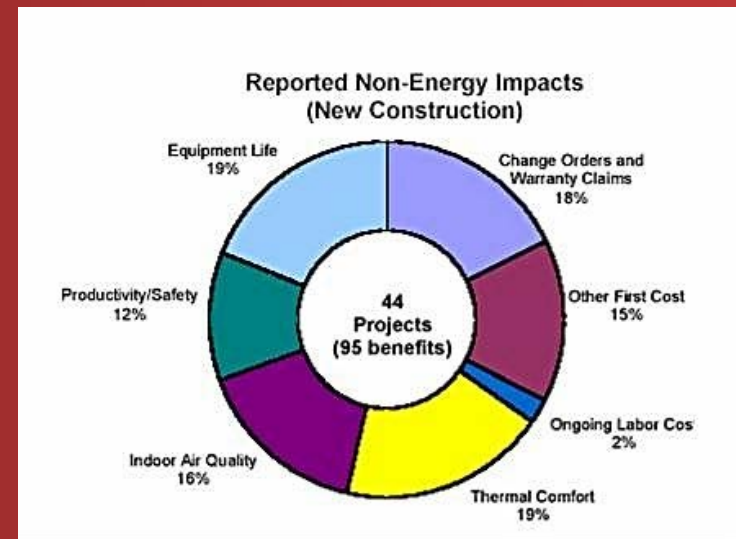
Improve Design & Reduce Construction Costs

- Design Review and Submittal Review by Commissioning Team
- Finds problems early while they can still be fixed economically. Study found an average of 28 deficiencies per building in new construction. Commissioning catches these so you don't have to.
- 61% of the time commissioning pays for itself just in construction cost savings.
- Fewer Change Orders and Claims



Reduce Operating Costs

- Energy Efficiency
 - Commissioning has an average 4.8 yr payback on energy savings alone
- Construction problems are found sooner, while still under warranty
- Operating Personnel are better trained and provided with better O&M documentation



LEED Commissioning - Two Parts

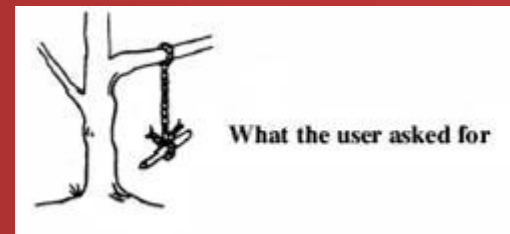
- EA Prerequisite 1: Fundamental Building Commissioning
- EA Credit 3: Enhanced Commissioning

What the user really
wanted



LEED Commissioning - Fundamental

- Commissioning Agent (CxA) creates a Commissioning Plan
- Develop Commissioning Specs
- Verify Installation and Performance of Commissioned Systems



LEED Commissioning - Enhanced

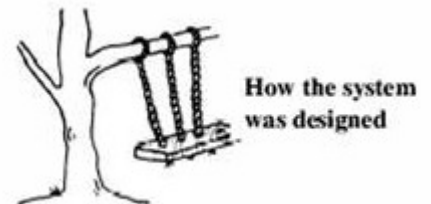
- CxA performs design reviews and submittal review
- Produce O&M Manual (contractor, with help from CxA)
- Provide Training (contractor, with help from CxA)
- 10-month warranty follow up by Commissioning Agent

How the analyst saw it



LEED Commissioning

- LEED Commissioning is basic commissioning: only energy-using systems are commissioned
 - HVAC
 - Lighting and Lighting Controls
 - DHW
- ½ Planning & Paperwork; ½ Actual Field Work



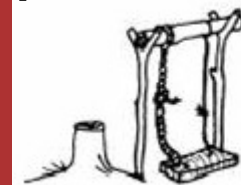
Contractor Role in Commissioning

- Contractor cooperates with CxA
 - Schedules walk thrus
 - Responds to questions
 - Works with CxA to develop system tests
- Functional Performance Testing
 - Contractor performs tests on his own
 - Contractor prepares a Certificate of Readiness
 - Contractor performs test again, witnessed by CxA, and corrects any deficiencies found



Contractor Role in Commissioning

- TAB Commissioning – TAB firm may be required to retest, say, 10% of devices, witnessed by CxA
- Contractor produces O&M Manuals and performs Training, witnessed by CxA
- CxA performs 10-month warranty walkthrough with Contractor

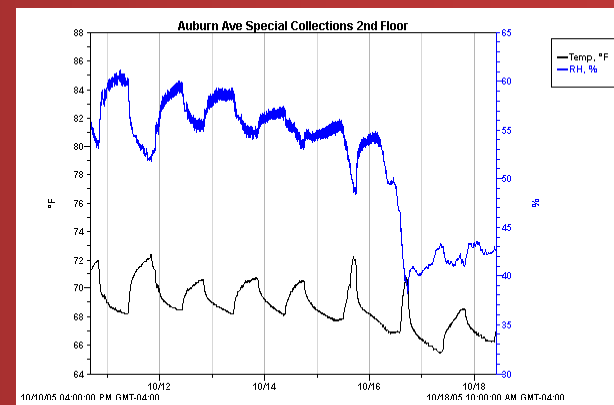


How it actually works

Commissioning of MEP Systems

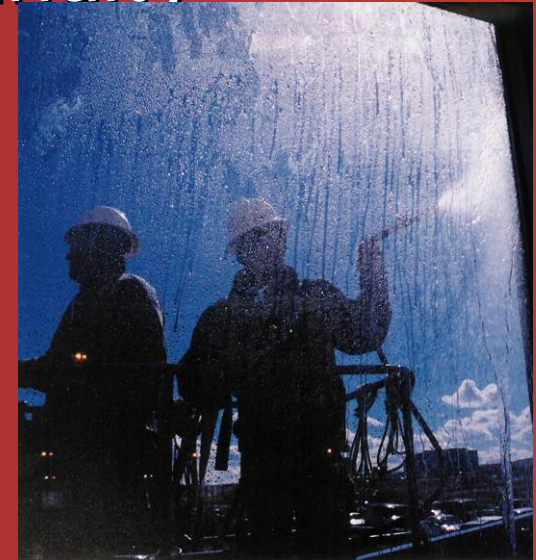


- HVAC, Domestic Hot Water, Lighting and Lighting Controls
 - Design Reviews by Professional Engineers
 - Construction Installation Inspections
 - Functional Testing of Equipment
 - Data Logging of Energy Use and Interior Comfort Conditions
 - O&M Manuals, Training of Operating Personnel, 10-month warranty inspection



Envelope Commissioning

- Drawing Review – to determine vapor pressure and dew points in walls, exterior drainage planes, wind barriers
- Thermal Performance Continuity Review
- Infrared Thermography
- Testing for Water Intrusion Building Envelope



Commissioning of Life Safety Systems

- Review of Hazardous Chemical Storage rooms for Explosion Protection, Containment of Spills, storage configurations and HVAC airflow installation.
- Separation of Control Areas per floor by fire resistive separation.
- Confirmation of HVAC system airflow to accomplish both positive and negative pressure in specific lab control areas.



IAQ Management



IAQ Management During Construction – Credit EQ 3.1

1. Meet or exceed control measures of SMACNA IAQ Guidelines, Chapter 3
2. Protect absorptive materials from moisture damage
3. If AHU's are used during construction, use MERV 8 filters and replace before occupancy



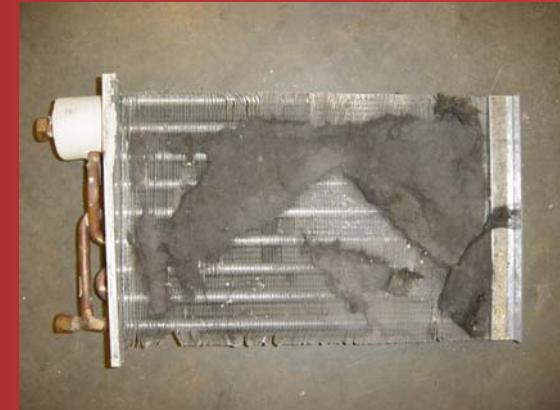
IAQ Management – SMACNA Guideline



1. HVAC Protection – seal openings with plastic, use MERV 8 filters, duct cleaning
2. Source Control – toxic materials, exhaust fumes
3. Pathway Interruption – isolate areas of work, install temporary seals, pressurize/depressurize
4. Housekeeping – dust management, site cleaning, remove standing water and spills
5. Scheduling – applies mainly to renovations

IAQ Management

- Develop an IAQ Management Plan
- Take photos during construction to show what was done
- Report if AHU's were used during construction and describe filtration media used
- Provide a narrative describing anything special done



IAQ Management Before Occupancy – EQ Credit 3.2

- Two Options – Flush Out or Air Testing
- Flush Out – after construction ends but before occupancy, flush out for approximately 2 weeks, or flush out while occupied under certain conditions
- Air Quality Testing – Conduct IAQ testing after construction but before occupancy

For More Info

- Subscribe to Energy Ace's free energy newsletter
- www.energyace.com
- www.peci.org
- www.cacx.org