


Saskatoon ASHRAE

Commissioning for New and Existing Buildings

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EDUCATION PARTNER

COURSE TITLE

By ASHRAE

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Course ID: 0090010881


Approved for:


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General CE hours


1


LEED-specific hours

















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Learning Objectives

1. Assemble team members and develop documents at the correct times in the design and construction process to obtain maximum benefits.
2. Apply commissioning documents to satisfy LEED requirements while at the same time using them to promote team communication and understanding.
3. Ensure the best possible Operations and Maintenance for the life of the building by preparing the O&M staff to succeed.
4. Recognize the improvements of LEED V4 commissioning that ensure quality and provide perseverance so that efficiency continues for the life of the building.

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Course Description


Commissioning is required by EAp 1 - Fundamental Commissioning of the Building Energy Systems. Enhanced Commissioning comes under EA3 for BD+C or EA2 for ID +C. LEED for Existing Buildings: O&M (LEED EBOM) provides six optional credits for commissioning. It is mandatory for many new construction projects and required by law for new and existing facilities in many cities.

Learn about commissioning from an expert who authored the original commissioning training program for LEED and founded the AIA Committee on the Environment (COTE) Commissioning Advisory Subcommittee. Some key areas that are addressed include: Commissioning for new and existing buildings, enhanced commissioning, quality assurance, high performance buildings, system operation and the roles of operation and maintenance (O&M) staff

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Purpose of Building Commissioning

The basic purpose of building commissioning is to provide a quality based process with documented confirmation that building systems are planned, designed, installed, tested, operated and maintained in compliance with the Owner's Project Requirements (OPR).



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The Commissioning Process

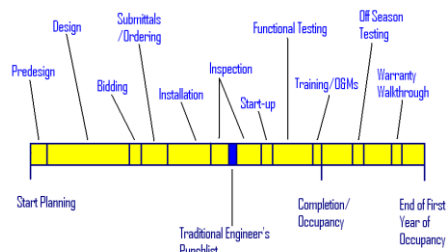
The Commissioning Process involves steps that are integrated into every phase of the project.

Commissioning is NOT just testing at the end!



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Cx is Not a Punchlist



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How does Commissioning help?

- Quality Process
 - Prevents/resolves problems
 - Designers focus on owner's needs
 - Discover/correct design issues early in design
 - Improves specifications & design documents
 - Reduces RFI's & change orders



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How does Commissioning help?

- Contractors focus on quality work
 - Correct and clear bid documents
 - Testing to verify proper operability
 - Interfaces builders with operators
 - On-Time delivery of O&M and Systems Manuals
 - On-Time Completion, fewer "callbacks" during warranty

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Approaches

- New Construction
 - Pre-design through occupancy
- Existing Buildings
 - Existing Building Commissioning (Retro-Commissioning)
 - In existing, Un-Commissioned buildings
 - Re-Commissioning
 - In previously Commissioned buildings

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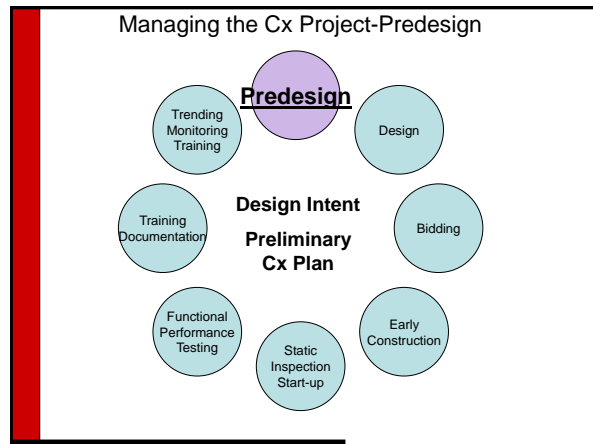
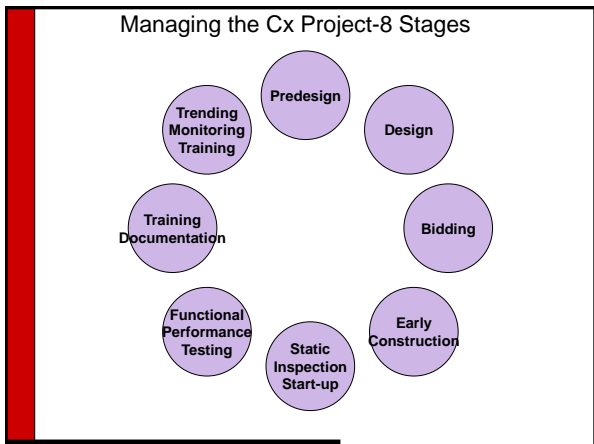
Systems to be Commissioned

Systems/equipment typically included:

- Mechanical Systems
 - HVAC and DDC Controls (Software programming and Hardware)
- Electrical Systems
 - Lighting, Standby Power, Renewable Power
- Building Envelope
- Specialty
 - Security and Fire Alarm Systems
 - Voice/Data Systems



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Commissioning: Pre-Design Phase

- Scope, RFP and Contract
- Select Commissioning Authority
- OPR, CFR
- Create Commissioning Plan

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Commissioning: Pre-Design Phase –OPR Requirements

- Owner's Project Requirements (OPR)
 - details what the owner expects of their building
 - living document because the criteria will change as decisions are made and/or tradeoffs are required

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Design Phase

- Document/Review Basis of Design
- Perform Commissioning Focused Design Review
- Include commissioning requirements in construction documents

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Design Review

The targeted **design review** :

- (a) General quality review of the documents, including legibility, consistency, and level of completeness.
- (b) Coordination between disciplines.
- (c) Discipline-specific review for achieving the OPR and BOD.
- (d) Does not include system selection, sizing, budget or equipment make and model.

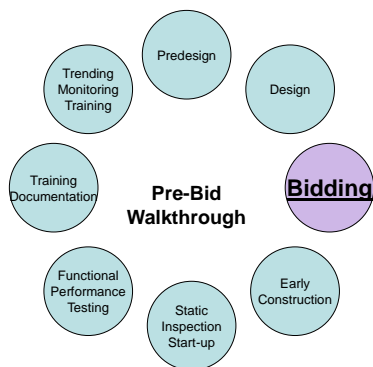


Cx Specifications

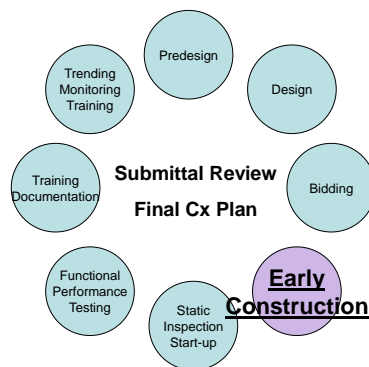
- (a) Scope and responsibilities of the GC in the "Summary of Work" section in Division 1
- (b) Cx section in Division 1 that details systems, requirements for documentation, training, meetings, and testing facility systems and assemblies
- (c) Specific equipment and component requirements and use of Construction Checklists in Divisions 2 through 16



Managing the Cx Project-Bidding



Managing the Cx Project-Early Construction

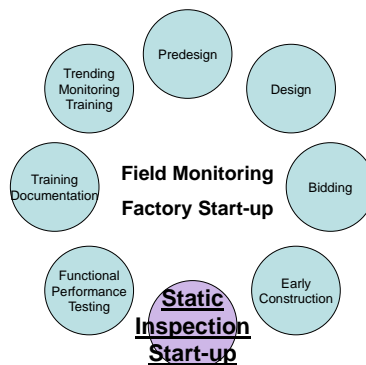


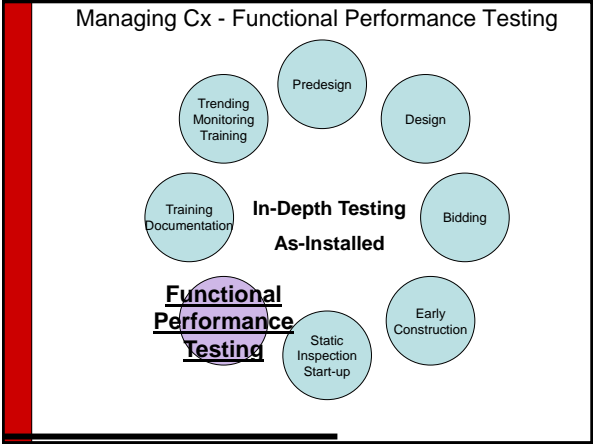
Early Construction Phase

- Review Submittals per Cx Plan, OPR, and BOD
- Review control sequences
- Develop construction checklists and functional test procedures
- Develop Systems Manual Outline



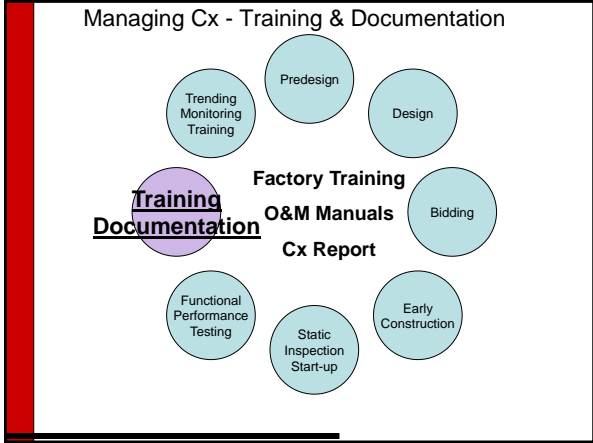
Managing the Cx Project - Static Inspection/Start-up



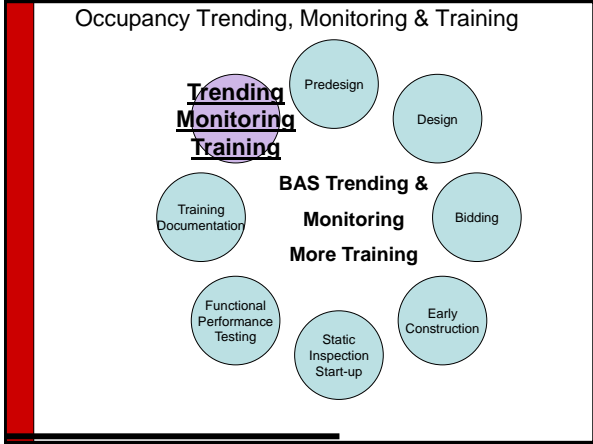


- ### Functional Performance Testing
- Perform Functional Performance Testing (FPT)
 - Documentation of deficiencies found during FPT's
 - Deficiency correction and retesting
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- ### Test Procedures
- Functional performance test procedures include:
- Participants required for the test
 - Prerequisites for the test performance
 - Step-by-step instructions to exercise the specific systems and assemblies under test
 - List of instrumentation, tools, and supplies required
 - Observations or measurements to be recorded and the range of acceptable results
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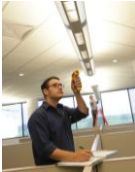


- ### Training and Documentation
- Check O&M Manuals for completeness and organization
 - Develop Systems Manual
 - Start Preventive Maintenance Plan
 - Expedite and Video Record Training
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Trending and Monitoring

- Ongoing guidance on operations and maintenance to achieve the OPR
- Off-season testing
- Warranty issues
- Lessons-learned meeting
- Optional: Periodic re-commissioning



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Resources for Further Learning

- California Commissioning Collaborative. CA Commissioning Guide for Existing Buildings and the CA Commissioning Guide for New Buildings. Both 2006. <http://www.documents.dgs.ca.gov/green/commissioninguideexisting.pdf> and <http://www.documents.dgs.ca.gov/green/commissioninguidenew.pdf>
- "The HVAC Commissioning Process", ASHRAE Guideline 0-2005 (supersedes Guideline 1-1996) and/or 1.1-2007 and 1.3-2011. Order at 800-527-4723, or on the Internet at http://www.techstreet.com/ashrae?ashrae_auth_token. The link is for the publications page, search for "commissioning" = 300+ documents.
- Building Commissioning Association <http://www.bcx.org/knowledge-center/bca-public-library/> Free Best Practices documents + External Links + more

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Resources for Further Learning

- The US General Services Administration (GSA) <http://www.wbdg.org/ccb/GSAMAN/buildingcommissioningguide.pdf>
- CA Collaborative of High Performance Schools (CHPS) 2006 Best Practices Manual. Very thorough Cx guide for schools <http://www.chps.net/dev/Drupal/node/288> Membership is free for schools and districts.
- UK Chartered Institution of Building Services Engineers (CIBSE) <http://cibse.org/> Do Topic Search for Commissioning. Set of seven guides. Free download to CIBSE members = \$175.



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Resources for Further Learning

- CA Sustainable Schools Commissioning Web Site <http://www.sustainableschools.dgs.ca.gov/SustainableSchools/sustainabledesign/commissioning/commissioning.html> Some of the same resources as CACx and some different.
- California Title 24 Commissioning <http://www.energy.ca.gov/title24/2013standards/index.html> Go to Standards, Compliance Manuals and Forms, 2013 Building Energy Efficiency Standards. Section 120.8.
- Washington State Department of Enterprise Services <http://www.des.wa.gov/services/facilities/Energy/Commissioning/Pages/default.aspx>

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Q & A



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Thank You for Attending

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