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BUILDING COMMISSIONING OVERVIEW
BCXP OVERVIEW
ONLINE TRAINING BY KRISHNAJI PAWAR
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MODULE 6

Costs, benefits, emerging issues, and commissioning challenges

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BUILDING COMMISSIONING BCXP OVERVIEW

In the past decade, researchers have studied Cx deployment scaling, the transition from HVAC-related gains to other system types, and the costs and advantages of Multi-Body Cx (MBCx) compared to EBCx, using more advanced analytics techniques.

Learning Objectives

- Course Overview and Introduction
- Definition and History of Building Commissioning
- Why is building commissioning needed?
- Building Commissioning Process Overview
- Professional Certification in Commissioning
- Cost and benefits of building commissioning
- Summary and Resources
- BCxP Sample Exam Question

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INTRODUCTION

- How scaling of Cx deployment due to codes, standards, utility EBCx programs, and market factors affects costs and benefits.
- Is Cx still dominated by HVAC-related operational improvements? Has there been a shift towards other system types?
- What data are available on the relative costs and benefits of Multi-Boundary Construction (MBCx) compared to Energy-Based Construction (EBCx)?



FUNCTIONAL PERFORMANCE TESTING OVERVIEW



- Core part of the commissioning process, requiring complete system installation, energized, programmed, balanced, and ready for operation.
- Dynamic testing of entire systems in fully automated mode.
- Tests conducted under various conditions including high or low cooling loads, component failures, unoccupied, varying outside air temperature and moisture, fire alarms, power failures.
- Planned by the commissioning provider and performed by the entire team.
- May reveal performance issues requiring significant follow-up and coordination.

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FUNCTIONAL PERFORMANCE TESTING OVERVIEW+



- Equipment operation is performed by the contractor or equipment manufacturer, but the commissioning authority directs, witnesses, logs, and reviews test data.
- ‘O&M Manual’, ‘System O&M Manual’ and ‘System Manual for Facilities’

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OPERATION & MAINTENANCE MANUALS OVERVIEW

- Contains information for building operation, maintenance, decommissioning, and demolition.
- Prepared by contractor with input from designers, suppliers, and Cx provider.
- Draft version provided for client handover.
- Final document not available until months post-practical completion due to seasonal readings.



O&M PERSONNEL AND BUILDING USERS TRAINING

- Transfer of knowledge and skills for building operation.
- Understanding of OPR and BoD.
- Training on O&M and System O&M Manuals.
- Commissioning provider reviews contractor's training content, materials, and instructor qualifications.
- Owner may designate Cx provider participation in training sessions or other methods.





COMMISSIONING COST IN BUILDING CONSTRUCTION



- Commissioning Authority services can cost between 0.5% and 1.5% of total construction costs.
- NASFA recommends budgeting 1.25 to 2.25% of total construction costs for Commissioning Authority services.
- U.S. General Administration Services' commissioning practice costs 0.5% of federal buildings and border stations.
- Complex projects like courthouses could cost 0.8–1% of the construction budget.
- Commissioning costs in India are significantly lower than US costs due to the Commissioning Authority's limited scope of work.

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RETRO-COMMISSIONING (RCX) OVERVIEW

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- A commissioning process in existing buildings to improve system performance and indoor environmental quality.
- Can resolve problems from design or construction or address issues developed during use.
- Fine-tunes and/or upgrades a building's operations and maintenance procedures to enhance overall performance.
- Aims to improve occupant comfort, identify operational and maintenance improvements, train operators, and review and enhance building documentation.
- Consists of five phases: planning, investigation, design, actual repair, and validation by commissioning authority.



ONGOING COMMISSIONING IN BUILDING MANAGEMENT

- Ongoing commissioning (OCx) is a continuation of initial commissioning processes during occupancy and O&M phase.
- It verifies that a project meets current and evolving OPR.
- OCx activities occur throughout the facility's life, some being continuous, others scheduled or unscheduled.
- To achieve objectives and identify smart solutions, facility managers must implement better technologies and a new management culture.



ONGOING COMMISSIONING IN BUILDING MANAGEMENT+

- Ongoing commissioning focuses on measured building operation data and continuous improvement.
- It contributes to a building's operation and maintenance, reducing reactive maintenance.
- Ongoing commissioning is part of proactive maintenance, identifying issues before they become bigger problems.
- It's an eight-step process that starts after the first year of operation, still considered part of the initial commissioning phase.





COMMISSIONING CHALLENGES AND EMERGING ISSUES

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CODE APPLICATIONS FOR COMMISSIONING



- Local and national energy codes and green codes now require commissioning and specific documentation.
- These requirements should be analyzed during pre-design and integrated into the OPR and commissioning processes.

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INCREASING BUILDING AND CONSTRUCTION TECHNOLOGIES

- The design and construction of buildings and systems have become increasingly complex, making the OPR process critical.
- The complexity of these systems increases the technical specifications in the OPR and the commissioning process.





BUILDING PERFORMANCE REPORTING



- Legislation and market demand for measuring and reporting facility resource efficiency have made the design, construction, and performance measurement of high-efficiency building systems increasingly important.
- Certification programs often require OPR and commissioning documentation for verification and credits.

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INTEGRATION OF HEALTH REQUIREMENTS WITH ENERGY AND SUSTAINABILITY

- Numerous sustainability, green building, and health-related programs for buildings and occupied spaces have been established, promoted, and mandated.
- Some directly require commissioning, while most are sufficiently complex that they require building system performance and reporting.



INTEGRATING CX INTO BUILDING OPERATIONS





The design, construction, and commissioning of facilities directly affect the performance of the facility and its systems for the life of the building.

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INTEGRATING AI INTO FAULT DEFECT AND DIAGNOSTIC (FDD) AND OPERATIONS

The introduction of AI automation and analytics into fault detection and diagnostic (FDD) systems is opening the door to allowing building systems to make minor system adjustments on their own.



OWNER VERSUS BUILDING USER





Many projects are core-and-shell made ready for a "tenant," with requirements that are greater than the original design concept.

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ADVANCED TRAINING FOR OPERATIONS AND MAINTENANCE PERSONNEL

As technical and technology-based building commissioning and regulatory requirements depend increasingly on data analytics, facility staff will require new knowledge, skills, and abilities.



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