
BEYOND
SMART CITIES
CERTIFIED COMMISSIONING SPECIALIST
CCXS ONLINE TRAINING
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
COMMISSIONING SPECIALIST CURRICULUM


BEYOND
SMART CITIES
CONSTRUCTION PHASE CXA
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
COMMISSIONING SPECIALIST CURRICULUM


LEARNING OBJECTIVES
Construction Phase Commissioning
Construction Phase Commissioning Objectives
Construction Phase Commissioning Activities
Pre construction Commissioning Conference
Commissioning Process Meetings
CxA Test procedures Requirements and Training.

CONSTRUCTION PHASE COMMISSIONING

In the construction phase, the commissioning process transitions from planning to application and is active during the entire construction phase. During pre-construction, the commissioning schedules are developed and integrated into the construction schedules.

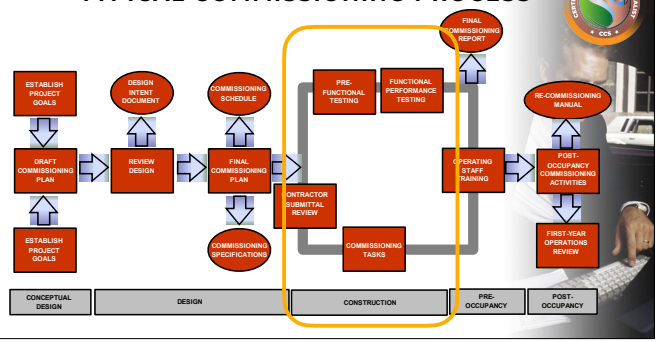
The CxP reviews the submittals for the commissioned systems and further develops the field observation, testing, and functional and performance requirements and checklists in the commissioning plans

In coordination with the construction schedules, the FPTs are conducted by the contractors along with the CxP as a witness.

Based on FPT results, a preliminary commissioning report is drafted and reviewed by the Owner and, if necessary, the local jurisdictions.

During pre-construction, the commissioning schedules are developed and integrated into the construction schedules.

TYPICAL COMMISSIONING PROCESS



CONSTRUCTION PHASE COMMISSIONING OBJECTIVES

Successful construction phase commissioning is a well-coordinated quality assurance and control process that encompasses installation, start-up, functional testing, documentation and training.

- ☐ The Commissioning Plan (Cx Plan), the OPR, and BOD are updated.
- ☐ Commissioning team members understand their roles and responsibilities for the construction phase commissioning activities.
- ☐ Equipment, systems, and assemblies are properly installed, maintainable, and functioning properly as required to meet the OPR.
- ☐ The operations and maintenance (O&M) personnel are provided with complete and proper systems operating documentation.
- ☐ The O&M personnel, and occupants as needed, are properly trained. Training materials and documentation compiled to facilitate repeating training and training new staff in the future.

CONSTRUCTION PHASE COMMISSIONING ACTIVITIES



- ☑ Updates to the Cx Plan, BOD, and the OPR to reflect changes made to the project by their original creators.
- ☑ Each project should be evaluated and when sufficiently advantageous to the success of the project, utilize electronic and cloud-based Cx management processes.
- ☑ Integrate the Commissioning Schedule into construction schedule. The CxP works with the contractor to integrate the Cx activities into the construction schedule, with adequate time to complete all commissioning activities.
- ☑ Conduct construction phase commissioning kick-off meeting

CONSTRUCTION PHASE COMMISSIONING ACTIVITIES+



- ☑ The CxP reviews submittals of commissioned equipment concurrently with the design team in a coordinated process that all parties agree to. Reviews normally focus on issues relative to commissioning facilitation.
- ☑ Hold construction phase controls integration meetings.
- ☑ Develop the master list of commissioned equipment, systems and assemblies. This list may also be utilized by the owner for O&M purposes
- ☑ During construction, the CxP, or the Contractor with CxP (with Owner review) should prepare from the specifications a list of the required warranties, spare parts and closeout documentation.
- ☑ Complete development of project specific Construction Checklists.

CONSTRUCTION PHASE COMMISSIONING ACTIVITIES+



- ☑ Develop functional testing procedures and test data forms. The functional test procedure forms are developed, usually by the CxP (or approved by them if developed by others), after the controls submittals and other commissioned systems and assemblies are approved.
- ☑ Maintain Issue Log. The CxP maintains an Issues Log to document and track commissioning items that do not comply with the construction documents and OPR.
- ☑ Conduct regularly scheduled commissioning coordination meetings.
- ☑ The contractor thoroughly executes the Construction Checklists and other required startup and checkout documentation and submits to the CxP and other required parties in a timely manner so they can be used to aid confirming test readiness.

CONSTRUCTION PHASE COMMISSIONING ACTIVITIES+



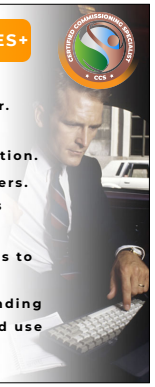
- ☑ Conduct regularly scheduled site visits. Site visits by the CxP are often held in concert with the construction or commissioning coordination meetings.
- ☑ Assist project team with resolution of issues. The commissioning provider provides constructive input for the resolution of system deficiencies.
- ☑ The CxP reviews contractor and special agency equipment start-up and quality control testing documents and witness selected or critical startups and contractor quality control tests
- ☑ CxP reviews requests for information and change orders of commissioned equipment. Comment as warranted to maintain the OPR.

CONSTRUCTION PHASE COMMISSIONING ACTIVITIES+



- ☑ Review the Testing, Adjusting and Balancing (TAB) plan and report.
- ☑ Confirm Functional Test Readiness.
- ☑ Coordinate, execute and document functional testing.
- ☑ CxP reviews contractor as-built documents, warranties and O&M Manuals.
- ☑ Compile the Construction Phase Commissioning Report.
- ☑ Finish Preparing the Systems Operations Guide. The Systems Operations Guide prepared by the CxP whose preparation began during design, provides the information needed to understand and properly operate, the building systems and assemblies and is submitted to the Owner.

CONSTRUCTION PHASE COMMISSIONING ACTIVITIES+



- ☑ Prepare the Commissioning Record. The CxP assembles documentation of the Cx process and submits to the Owner. Refer to the Design Phase, Section 3, for its contents.
- ☑ Assemble the Contractor's Project Turnover Documentation.
- ☑ Verify training of the owner O&M personnel and end users. Verify that the training for the owner's operating staff is conducted in accordance with the project documents.

The key objective of the owner's operating staff training is to convey knowledge and skills required to effectively and efficiently operate the facility. This includes an understanding of the OPR and BOD as well as training on the purpose and use of the Systems Operations Guide

PRE CONSTRUCTION COMMISSIONING CONFERENCE

The Pre-construction Commissioning Conference takes place after the construction contract has been given to the winning bidder.

During the Pre-construction Conference, administrative details such as paperwork transfers, naming of sub- contractors, and site limitations such as access and fence-off are discussed.

During the Pre-construction Commissioning Conference, the following areas should be addressed:

- ☑ Identification of roles, explanation of how Commissioning tests and test demonstrations, as well as systems' tests, will be held during construction, responsibility given to the contractors to perform (and ensure positive results of) Commissioning tests before calling the Commissioning Authority to witness such tests, and
- ☑ The provision of documents, checklists, forms, etc. to the contractor to be able to perform and document the tests required.

COMMISSIONING PROCESS MEETINGS

Similar to the way the Weekly Project Meeting is to ensure construction stays on schedule, the main function of the CPM meetings is to ensure that things are on schedule from a Commissioning perspective.

During the monthly Commissioning Progress Meetings, the general status of the Commissioning project should be addressed. These meetings are also the best place to ask several questions regarding installations for several areas including:

- ☑ Systems and Equipment. Have these been installed according to the specifications? the provision of documents, checklists, forms, etc. to the contractor to be able to perform and document the tests required.
- ☑ Is the equipment that will need regular maintenance accessible?
- ☑ Are there any ducts, pipes, or wires, etc. blocking areas that are needed for access by operations or maintenance people?
- ☑ Are gages, sensors, and other controls located in places such that they can provide actual & real-time measurements and can be seen by maintenance personnel?



TESTING CONTRACTOR

- ☑ A Testing Contractor might be needed for highly complex projects. If a Testing Contractor is required, this should be stated in the specifications, and responsibility for hire given to the prime contractor and not the construction project manager.
- ☑ The specifications requiring a Testing Contractor should include required qualifications and what his or her responsibilities will be.
- ☑ These responsibilities will include: extensive experience with environmental systems, operational systems, and life and safety systems, knowledge of design, communication and writing skills, management and organizational skills, etc.


MONITOR CXA CONSTRUCTION ACTIVITIES
Equipment and Materials; these should include operational details and functional curves, not just size and general tolerances,
Coordinated Shop Drawings. Shop drawings are required to see how components and equipment will fit and function within a system
Installation & Startup Instructions.
Operation & Maintenance Manuals, and
Training Plan & Materials for appropriately training staff.


TRAINING
The key objective of the owner's operating staff training is to convey knowledge and skills required to effectively and efficiently operate the facility.
This includes an understanding of the OPR and BOD as well as training on the purpose and use of the Systems Operations Guide.
Trainees complete a basic training evaluation form providing feedback regarding effectiveness.


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