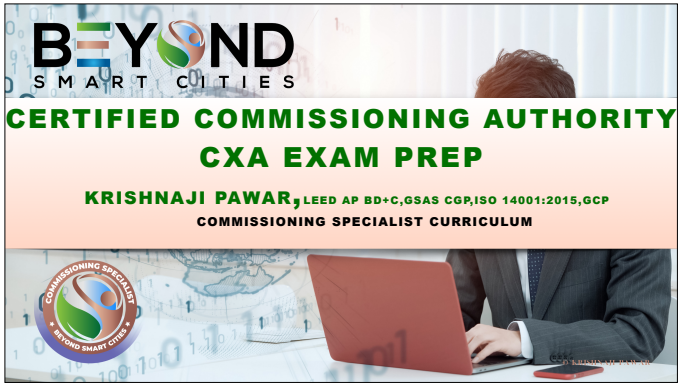

BEYOND
SMART CITIES
CERTIFIED COMMISSIONING AUTHORITY
CXA EXAM PREP
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
COMMISSIONING SPECIALIST CURRICULUM


GREEN BUILDING COMMISSIONING
MANAGING CXA PROJECTS
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
COMMISSIONING SPECIALIST CURRICULUM


LEARNING OBJECTIVES
Overview of Commissioning
Identify the scope of the project
Participate in Value Engineering Activities
Benefits of Commissioning
Beginning the Commissioning Process
Which Systems Should Be Commissioned ?
The Commissioning Management Team



OVERVIEW OF COMMISSIONING

Building commissioning (Cx) is a professional practice that facilitates the planning, design, construction, installation and testing verification, documentation, and operation of facilities and systems to conform to the Owner's Project Requirements (OPR).

CxA is not a single occurrence, but a process which ensures that a building meets the best quality and reliability performance for its budget.

The process begins during the conceptual phase of the building (pre-design) and continues through each phase of design

CxA is not an event. CxA is a process. A properly applied Building Commissioning Process ensures quality for each aspect of the building project.

COMMISSIONING PROCESS GOALS

The primary goal is to provide a safe and healthy facility for employees and public in a commercial facility ,or for students, faculty ,staff, and the public in an educational facility

The Second goal is to improve energy performance. Maximizing energy performance of installed equipment, materials, and systems

The third goal is to reduce operating costs.Reducing equipment and facility operating costs,

The forth goal is to improve the orientation and training of the staff who will operate and Maintain the systems and equipment.

The fifth goal is provide improved documentation.

The final and most important goal is to meet the owner's needs Systematic critical observation ,verification ,and functional performance testing of the design and construction will achieve the overall goal of providing a facility that operates as intended and thereby will result in a satisfied owner.

IDENTIFY THE SCOPE OF THE PROJECT

Commissioning scope, process, and responsibilities must be clearly defined and communicated from the OPR through the commissioning plan and construction documents.

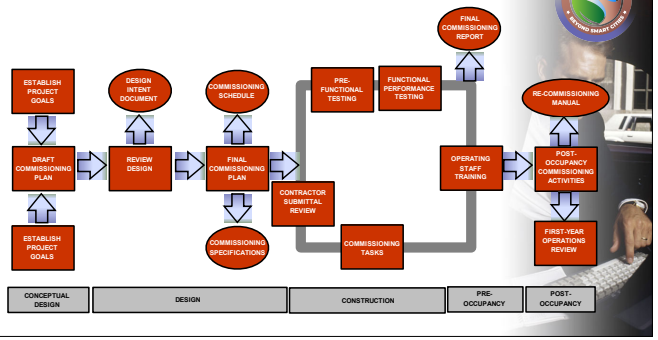
The scope addresses the equipment to be commissioned, which can vary depending on the project and programs.

The commissioning process and plan should include regular meetings, program compliance, and reporting requirements, establishing and maintaining lines of communication with the building Owner, design team, contractor, and other team members.

This process includes documentation and enforcement of specification and contractual provisions, identifying specialized tests, and creating schedules for commissioning activities and detailing required reports.

The success of the commissioning process and to a large extent the project depends upon meeting these plans, specifications, and requirements.

TYPICAL COMMISSIONING PROCESS



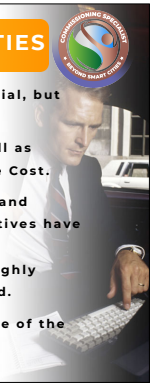
PARTICIPATE IN VALUE ENGG ACTIVITIES

- Value Engineering is a conscious and explicit set of disciplined procedures designed to seek out optimum value for both initial and long-term investment.Value Engineering (VE) is not a design/peer review or a cost-cutting exercise.
- Through a group investigation, using experienced, multi-disciplinary teams, value and economy are improved through the study of alternate design concepts, materials, and methods without compromising the functional and value objectives of the client
- VE can be applied at any point in a project, even in construction. However, typically the earlier it is applied the higher the return on the time and effort invested. The three main stages of a project and VE's application are described below.

PARTICIPATE IN VALUE ENGG ACTIVITIES

- Planning : At the Planning stage of development, there are additional benefits to be derived from a Value Engineering Workshop
- Design : This is the stage that most VE participants are used to becoming involved, when the design has at least made it to the schematic stage. Most government agencies require at least one VE session at the design stage on projects over a certain $ size. The primary tool available to the VE team is the Workshop—typically a 40-hour session (or less for smaller or less complex projects).
- Construction : During this phase value engineering is still possible through the use of Value Engineering Change Proposals (VECP). Contractors can be provided monetary incentives to propose solutions that offer enhanced value to the owner, and share in the financial benefits realized.

PARTICIPATE IN VALUE ENGG ACTIVITIES



In the final analysis, Value Engineering is not only beneficial, but essential because:

- ☑ The functionality of the project is often improved as well as producing tremendous savings, both initial and Life-Cycle Cost.
- ☑ A "second look" at the design produced by the architect and engineers gives the assurance that all reasonable alternatives have been explored.
- ☑ Cost estimates and scope statements are checked thoroughly assuring that nothing has been omitted or underestimated.
- ☑ Assures that the best value will be obtained over the life of the building.

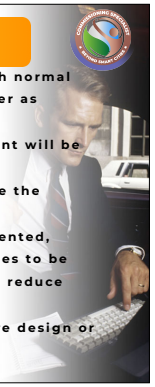
BENEFITS OF COMMISSIONING



Building commissioning provides tangible and quantifiable benefits to building owners, its occupants, construction teams, and society at large.

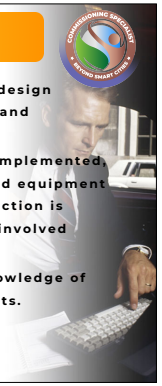
- ☑ Optimization and efficiency
- ☑ Improved comfort and indoor air quality
- ☑ Longer building and equipment service life
- ☑ Getting to know buildings better

OWNER BENEFITS



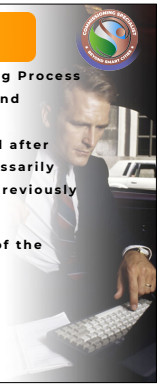
- ☑ Systems in the building will function properly, under both normal and emergency conditions, and will interact with each other as planned.
- ☑ Occupants will be safe in the building and the environment will be controlled to ensure their health and comfort.
- ☑ Systems efficiency will be established and ensured before the project is considered complete.
- ☑ Maintenance operations will be fully and properly documented, allowing operators to be properly trained and best schedules to be known to reduce wear on the components and systems and reduce costs for down-time and replacement.
- ☑ Establishment of a fully documented foundation for future design or maintenance changes.

DESIGN PROFESSIONAL BENEFITS



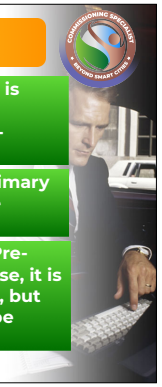
- ☑ Availability and input of an operating engineer into the design process to allow for more reliable and complete drawings and choice of materials and components.
- ☑ A quality review of the designs before they start being implemented, and thorough performance testing of installed systems and equipment minimize the Designer's need to be involved after construction is begun and virtually eliminates the Designer's need to be involved after construction is completed.
- ☑ Design Professionals can add their participation and knowledge of the Commissioning Process to their list of accomplishments.

CONTRACTOR BENEFITS



- ☑ Fewer delays and budget problems, as the Commissioning Process demands that all participants emphasize quality control and facilitates quicker and easier problem correction.
- ☑ Virtually eliminates the Contractor's need to be involved after construction is completed and reduces time spent unnecessarily backtracking to resolve problems that should have been previously caught.
- ☑ Contractors can add their participation and knowledge of the Commissioning Process to their list of accomplishments.

BEGINNING THE CXA PROCESS

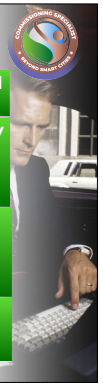


Despite the popular assumption that Commissioning is something that happens at the end of construction, Commissioning should actually begin during the Pre-Design phase or Programming.

At the very least, during the Pre-Design phase the primary players in the building project should decide that the building will be Commissioned.

If a Commissioning Authority is brought in after the Pre-Design phase, during the Design or Construction phase, it is still possible to complete the Commissioning Process, but changes to design and construction contracts must be discussed at the onset.

WHICH SYSTEMS SHOULD BE COMMISSIONED



Ideally ,all building systems both static and dynamic should be commissioned

Dynamic systems are more readily recognised because they are the ones that maintain the environment ,provide utility services, convey people ,materials ,and communications, and respond to emergent conditions

Static systems are not recognised as readily because they include the building envelope ,contribute to the. Desired acoustic environment ,minimise vibration ,mitigate seismic impacts and so forth

Beyond the health and safety systems ,the owner should focus on those systems in the previous projects whose unsatisfactory performance has pledged occupants and operations staff

THE CXA MANAGEMENT TEAM

There are many participants in the commissioning process, particularly in large and complex projects, and each participant and organization must understand their role and responsibilities.

- ☑ Owner or Owner's Representative
- ☑ Commissioning Provider
- ☑ Other Commissioning Team Members
  - Architect /Engineering Professional
  - Subcontractor and installers
  - TAB Firm/ Manufactures and suppliers
  - LEED OR BSAS Program Administrator



