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ONLINE TRAINING BY KRISHNAJI PAWAR

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# Commissioning in Sustainable Construction

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Commissioning in sustainable construction is a systematic process that ensures a building's systems are designed, installed, tested, and capable of being operated and maintained according to the owner's operational requirements.

# Learning Objectives +

- Benchmarking with Performance Metrics
- Water Conservation
- Commissioning in Sustainable Construction
- Energy and Materials Use and Management
- Summary and Resources
- HBDP Practice Test V.4.1\_Test Your Knowledge!



## COMMISSIONING IN SUSTAINABLE CONSTRUCTION

- A systematic process ensuring a building's systems are designed, installed, tested, and operationally maintained.
- The process begins in the pre-design phase, defining project goals, developing a commissioning plan, and integrating sustainable practices.
- The commissioning team actively participates in the construction phase, ensuring building systems are installed according to specifications.
- Post-construction, the process transitions to a rigorous acceptance phase, where systems are tested to confirm their performance.
- The final phase involves post-occupancy evaluation (POE), where the building's performance is monitored and assessed.
- Benefits of the commissioning process include enhanced energy efficiency, improved indoor environmental quality, cost savings, and sustainability certification.
- As demand for high-performance, sustainable buildings grows, commissioning becomes vital in shaping future construction practices.

# COMMISSIONING DOCUMENTATION IN SUSTAINABLE CONSTRUCTION

## Introduction to Commissioning

- Commissioning is a systematic process that ensures building systems perform according to the owner's operational requirements and design intent.
- In sustainable construction, commissioning incorporates environmental performance, energy efficiency, and occupant health.

## Purpose of Commissioning Documentation

- Defining Project Goals: Outlines the sustainable design goals and performance metrics.
- Establishing Accountability: Outlines the roles and responsibilities of all stakeholders involved in the commissioning process.
- Providing a Reference: Acts as a reference for verifying compliance with sustainable standards and performance benchmarks.
- Facilitating Communication: Enhances communication among project participants.



# UNIQUE REQUIREMENTS FOR SUSTAINABLE CONSTRUCTION +

- Energy Performance Verification: Involves rigorous energy modeling during the design phase.
- Indoor Environmental Quality (IEQ): Specifies measures to ensure high indoor environmental quality, including air quality, thermal comfort, and natural lighting.
- Water Efficiency Strategies: Outlines strategies for water-efficient fixtures, rainwater harvesting systems, and greywater recycling.
- Renewable Energy Integration: Outlines performance criteria for renewable energy systems like solar panels or wind turbines.
- Sustainable Material Selection: Includes criteria for the selection of sustainable materials, focusing on lifecycle impacts, sourcing, and recyclability.
- Building Operation and Maintenance Plans: Outlines routine inspections and performance testing for HVAC systems.



# DETERMINING OWNER'S OBJECTIVES AND CRITERIA FOR COMMISSIONING DOCUMENTATION

- Commissioning documentation is crucial in project management and construction.
- It aligns with the owner's objectives and criteria, ensuring project success.

## Importance of Owner's Objectives

- Owner's objectives reflect the vision, mission, and strategic goals of the organization.
- They can vary depending on the project's nature and the broader context.
- Examples include improving patient care, enhancing operational efficiency, and ensuring compliance with health regulations.

## Identifying the Owner's Criteria

- Criteria for commissioning documentation serve as benchmarks against which the project's success will be measured.
- Criteria can include functionality, performance, energy efficiency, cost-effectiveness, and adherence to regulatory standards.



# STRATEGIES FOR DETERMINING OBJECTIVES AND CRITERIA +

- Stakeholder Engagement: Involves interviews, surveys, and workshops with key stakeholders.
- Document Analysis: Reviewing existing documentation provides insights into the owner's vision and requirements.
- Benchmarking Best Practices: Identifying best practices from similar projects informs the development of objectives and criteria.
- Facilitated Workshops: Facilitating collaboration and generating new ideas.
- Continuous Feedback Loops: Establishing mechanisms for ongoing feedback during the commissioning process allows for the refinement of objectives and criteria.

## Documentation of Objectives and Criteria

- Objectives Statement: A concise description of the overarching goals of the project.
- Criteria Matrix: A detailed breakdown of measurable criteria linked to each objective.
- Risk Assessment: Identification of potential risks associated with not meeting the objectives and criteria, along with mitigation strategies.





# UNDERSTANDING COMMISSIONING SCOPE IN DOCUMENTATION

## Definition and Importance of Commissioning Scope

- Commissioning scope is a comprehensive outline of tasks, responsibilities, and activities required for a facility, system, or piece of equipment to operate as intended.
- It is a critical component of the commissioning process, ensuring systematic verification and validation of a project's performance criteria against its design specifications and operational requirements.



## Importance of Defining the Commissioning Scope

- Clarifies roles and responsibilities: It helps stakeholders understand their specific roles in the commissioning process, avoiding overlaps and gaps in responsibilities.
- Establishes performance criteria: A well-defined commissioning scope includes specific performance criteria that the facility or system must meet.
- Provides insights into resources needed: The scope provides insights into the resources needed—financial, human, and material—for better budget management and scheduling.
- Serves as a quality assurance framework: Outlining the commissioning tasks serves as a quality assurance framework, promoting adherence to industry standards and regulations.
- Aids in risk mitigation: A clearly defined commissioning scope helps identify potential risks early in the project lifecycle, enabling teams to develop mitigation strategies.

## COMPONENTS OF THE COMMISSIONING SCOPE +

- **Project Overview:** A brief description of the project, including its purpose, major systems involved, and key stakeholders.
- **Objectives:** Specific goals of the commissioning process, such as ensuring energy efficiency, verifying system performance, and validating that the facility meets operational requirements.
- **Scope of Work:** A detailed account of the commissioning activities to be performed.
- **Schedule:** A timeline indicating when each component of the commissioning work will take place.
- **Deliverables:** Clearly defined outputs of the commissioning process, such as commissioning reports, test results, and operational manuals.
- **Acceptance Criteria:** Specific metrics or benchmarks that must be met for the commissioning process to be deemed successful.
- **Stakeholder Engagement:** Identification of the stakeholders involved in the commissioning process, their roles, and how they will be engaged throughout the project.





# SPECIFICATION OF SYSTEMS AND OPERATIONS IN COMMISSIONING DOCUMENTATION

Commissioning documentation is a comprehensive repository of information ensuring the intended performance of systems and operations.

It includes:

- Commissioning Plan: A strategic outline detailing objectives, scope, and processes.
- System Specifications: Detailed descriptions of each system, including design criteria, performance parameters, and operational requirements.
- Test Procedures: Protocols for verifying that systems operate according to specifications.
- Acceptance Criteria: Standards or benchmarks that must be met for systems to be deemed acceptable.
- Record Keeping: Documentation of testing, observations, and corrective actions taken during the commissioning process.



## Specification of Systems

- System Specifications articulate the technical and operational requirements for each system installed within the project.
- Components of System Specifications include:
  - System Description: A narrative that provides an overview of the system, including its purpose and function within the larger project.
  - Performance Criteria: Quantifiable metrics that the system must meet.
  - Operational Parameters: Include the normal operating conditions under which the system is expected to function.
  - Compliance Standards: All systems must comply with industry standards and regulations.

## SPECIFICATION OF OPERATIONS +

Operational Specifications include:

- Operational Workflow: A description of the procedures for starting, operating, and shutting down systems.
- Training Requirements: Specifications should include the training needed for personnel to operate the systems effectively.
- Maintenance Protocols: Clear guidelines for routine inspections and maintenance tasks.
- Emergency Procedures: Steps to be taken in the event of system failures or emergencies.

### Conclusion

- The specification of systems and operations within commissioning documentation is vital to the successful implementation and operation of building systems.
- Adherence to well-defined specifications can lead to greater project success and operational excellence.





## COMMISSIONING DOCUMENTATION: SEQUENCE OF OPERATIONS

- Pre-Commissioning Planning: Establishes a clear framework and objectives for commissioning activities.
- Design Review: Assesses design documents to ensure they meet operational requirements and commissioning goals.
- Construction Oversight: Monitors construction activities to ensure adherence to design specifications and commissioning objectives.
- System Verification and Testing: Verifies that installed systems and components operate according to design specifications.
- Training and Documentation: Provides training to facility staff and compiles operational manuals and maintenance guides.
- Final Commissioning Report: Summarizes the commissioning process and outcomes.
- Post-Occupancy Evaluation: Assesses building performance and user satisfaction after occupancy.
- The sequence of operations in commissioning documentation fosters effective communication, thorough documentation, and successful project delivery.
- Proper execution of these steps is essential for achieving the ultimate goal of commissioning: to ensure that the built environment operates effectively, efficiently, and in alignment with the users' needs.





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# THANK YOU

