

Building Commissioning

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Introduction to Building Commissioning

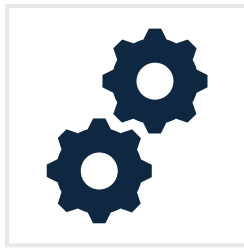
Building commissioning is a systematic process used to ensure that building systems are designed, installed, tested, and operated according to the owner's requirements.

Commissioning helps identify and resolve issues early, improves energy efficiency and operational performance, and ensures that buildings perform as intended.

Quick Question

How familiar are you with the commissioning process?

Purpose of Building Commissioning



Ensuring

Ensuring Systems Perform as Intended: Commissioning verifies that building systems function correctly and meet performance criteria specified by the owner.



Identifying and Resolving

Identifying and Resolving Issues Early: Early detection of issues during commissioning helps prevent costly rework and ensures that systems operate reliably.



Improving

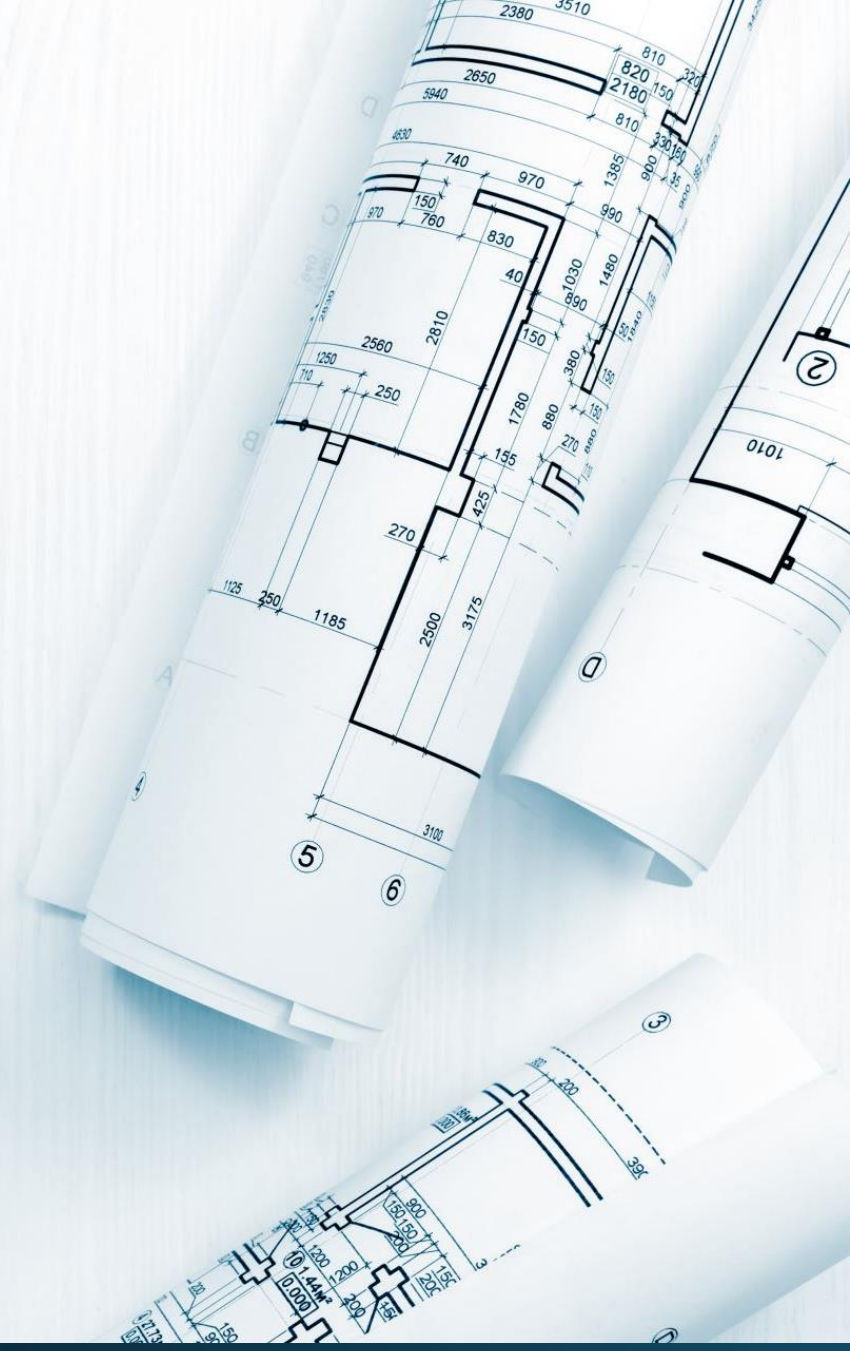
Improving Energy Efficiency and Operational Performance: Commissioning optimizes building systems for energy efficiency, occupant comfort, and operational effectiveness.

Several key roles are involved in the commissioning process:

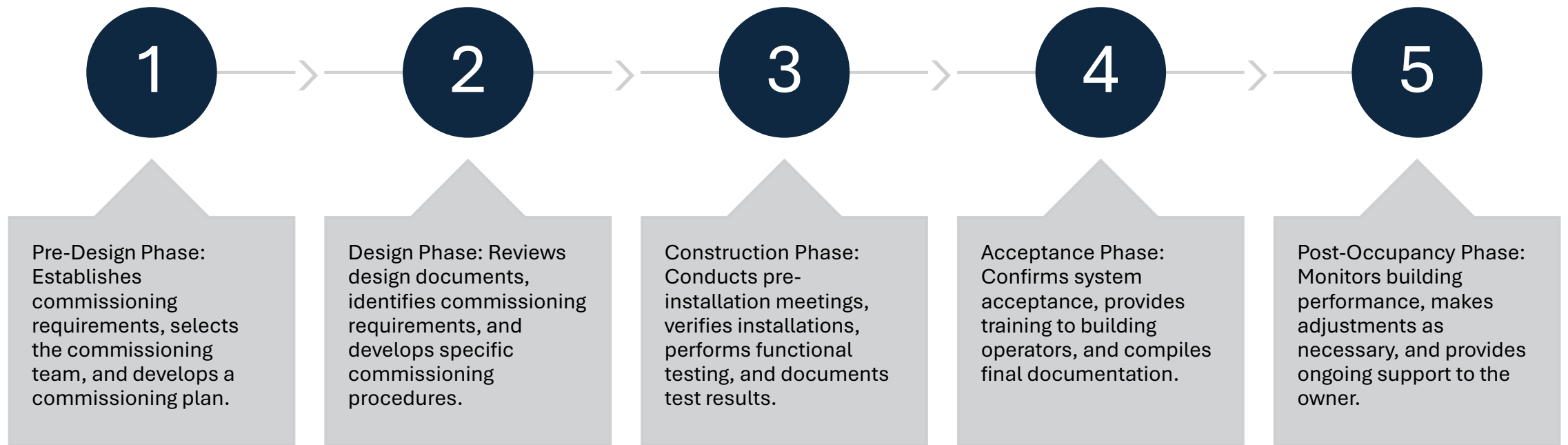
- **Commissioning Authority (CxA):** Oversees the commissioning process and ensures that all activities are carried out according to the established plan and requirements.
- **General Contractor (GC):** Manages construction activities on-site and coordinates with subcontractors to facilitate the commissioning process.
- **Subcontractors:** Install specific building systems and components according to design specifications.
- **NAVFAC Representatives (for military projects):** NAVFAC personnel oversee and manage military construction projects, ensuring compliance with NAVFAC standards and requirements.



When should the
commissioning
agent get involved
with the
construction
project?



Phases of the Commissioning Process



1) Pre-Design Phase

- **Establishing Commissioning Requirements:** Defining the scope, objectives, and expectations for the commissioning process.
- **Selecting Commissioning Team:** Assembling a team of commissioning agents, including a commissioning authority (CxA), who will oversee the process.
- **Developing Commissioning Plan:** Creating a detailed plan outlining commissioning activities, responsibilities, and schedule.



2) Design Phase

- **Reviewing Design Documents:** Assessing design plans and specifications to ensure they meet the owner's requirements.
- **Identifying Commissioning Requirements:** Determining the systems and components that will require commissioning and developing specific commissioning procedures.



3) Construction Phase

- **Conducting Pre-Installation Meetings:** Holding meetings with contractors and subcontractors to review commissioning requirements and expectations.
- **Verifying Installations:** Inspecting equipment installations to verify compliance with design specifications.
- **Performing Functional Testing:** Testing systems to ensure they operate as intended and meet performance criteria.



4) Acceptance Phase

- **Confirming System Acceptance:** Conducting final tests and inspections to ensure systems meet performance criteria.
- **Providing Training:** Offering training to building operators and maintenance staff on how to operate and maintain systems effectively.
- **Compiling Final Documentation:** Documenting test results, equipment manuals, maintenance procedures, and other relevant information.



5) Post-Occupancy Phase

- **Monitoring Building Performance:** Tracking building performance data to identify issues or deficiencies.
- **Making Adjustments:** Adjusting systems as necessary to optimize performance.
- **Providing Ongoing Support:** Offering ongoing support to the owner and facility staff as needed.



Commissioning Requirements for NAVFAC Projects

- Unified Facilities Criteria (UFC)
- Military Handbook (MIL-HDBK)
- Naval Facility Command Instruction (NAVFACINST)



Unified Facilities Criteria (UFC)

UFC documents provide planning, design, construction, sustainment, restoration, and modernization criteria, and apply to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with DoD Directive 4270.5 (Military Construction) and USD(AT&L) Memorandum





Unified Facilities Criteria (UFC)

- **Overview of UFC Documents:** UFC documents provide guidance on planning, design, construction, and operation of military facilities.
- **Guidance on Design, Construction, and Operation:** UFC documents cover a wide range of topics, including building codes, sustainability, security, and safety.

Military Handbooks (MIL-HDBK)

A series of handbooks that provide technical guidance and criteria for various aspects of military facilities design, construction, and operation.

MIL-HDBK documents cover a wide range of topics, including electrical engineering, mechanical engineering, civil engineering, environmental engineering, and more.



Military Handbooks (MIL-HDBK)

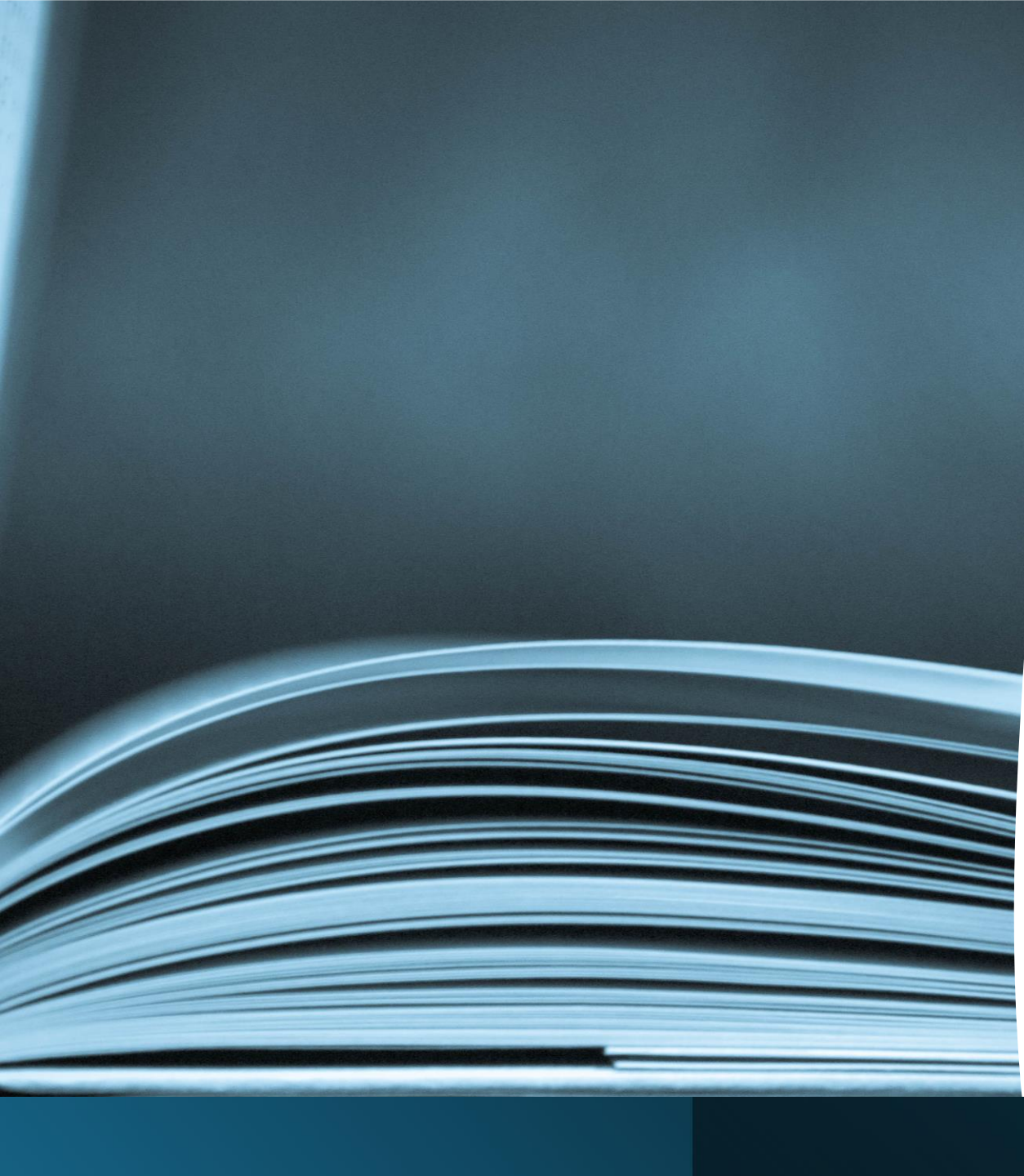
- **Technical Guidance for Military Facilities:** MIL-HDBKs contain detailed technical guidance and criteria for specific aspects of military facilities design and construction.
- **Requirements for Commissioning Processes:** MIL-HDBKs may include standards and procedures related to commissioning, such as testing protocols and equipment specifications.



Naval Facility Command Instruction (NAVFACINST)

- A series of instructions that provide detailed guidance, procedures, and requirements for various aspects of NAVFAC operations, including facility planning, design, construction, maintenance, and management.
- Cover a wide range of topics related to the planning, design, construction, and operation of Navy facilities, infrastructure, and real property assets.
- Establish standards, policies, and procedures to ensure that NAVFAC projects comply with applicable laws, regulations, and military requirements.





Naval Facility Command Instruction (NAVFACINST)

- **Instructions for NAVFAC Projects:** NAVFAC instructions provide detailed guidance and requirements for NAVFAC personnel, contractors, and other stakeholders involved in military construction projects.
- **Requirements for Commissioning Activities:** NAVFACINSTs may include specific directives related to commissioning processes, documentation requirements, and quality assurance procedures.



Operational Readiness Testing

- **Simulation of Operational Conditions:** Testing systems under simulated operational conditions to verify readiness for mission-critical activities.
- **Verification of Mission-Critical Functionality:** Ensuring that systems perform as intended and meet operational requirements.

Reference:

DoD Unified Facilities Criteria (UFC) 4-010-01



Security and Safety Standards

- **Compliance with NAVFAC Security Standards:**
Meeting stringent security standards to protect personnel, assets, and mission-critical operations.
- **Testing and Verification of Security Systems:**
Verifying the performance of security systems, including access control and intrusion detection.

Reference:

NAVFAC Security Engineering Manual

Resilience and Continuity of Operations (COOP)

- **Testing Backup Power Systems:** Verifying the performance of backup power systems to ensure continuity of operations during emergencies.
- **Emergency Communication Systems:** Testing communication systems to maintain connectivity during emergencies.
- **Continuity of Operations Plans:** Ensuring readiness to maintain mission capabilities in adverse conditions.

Reference:

DoD Instruction 3020.37



Independent Oversight in Commissioning

- **Verification of System Startup and Testing:** Independent verification of system startup and testing to ensure compliance with design specifications and operational requirements.
- **Importance of Independent Commissioning Agents:** Commissioning agents provide an additional layer of scrutiny to identify and resolve issues early in the construction process.

Reference:

Building Commissioning Association (BCA)



Benefits of Commissioning

- **Improved Building Performance:** Commissioning optimizes building systems for energy efficiency, occupant comfort, and operational effectiveness, leading to improved overall performance.
- **Energy Efficiency Savings:** By identifying and addressing inefficiencies, commissioning can result in significant energy savings over the life of the building.
- **Enhanced Occupant Comfort and Satisfaction:** Commissioning ensures that building systems operate reliably and effectively, enhancing occupant comfort and satisfaction.

Reference:

Lawrence Berkeley National Laboratory (LBNL)



Case Study: Commissioning of a Military Facility

- **Overview of the Project:** Provide details about the specific military facility and the commissioning process undertaken.
- **Challenges Faced:** Describe any challenges encountered during the commissioning process, such as compliance with NAVFAC standards or operational readiness testing.
- **Solutions Implemented:** Discuss solutions implemented to address challenges and ensure successful completion of the commissioning process.

Reference:

NAVFAC Case Studies



In Conclusion...

Questions?