

## **White Paper: What is Building Commissioning?**

By Wendy Collins, P.Eng.

The term commissioning was first used to describe the act of putting a ship into active duty. Once the ship had been successfully put through a series of documented, rigorous tests, it would be considered commissioned and ready for service. The same is true for Building Commissioning. Building Commissioning is a well-documented process, which is most beneficial, when it is implemented during **Pre-design** and continued throughout all stages of the project; **Design**, **Construction** and **Post Construction**.

### **Pre-design Stage**

During the Pre-design stage the Design Team is selected by the Owner. This will include the Commissioning Authority (CxA). The CxA will attend meetings with the Design Team and the Owner to establish the design criteria and begin developing the Owner's Project Requirements (OPR). The OPR is used as a measure throughout the commissioning process to ensure that the building turned over to the Owner meets their needs, requirements and expectations.

### **Design Stage**

As the design development continues from concept through to tender documentation, the Cx A works closely with the design team to achieve the following:

- Develop the Commissioning Requirements and ensure they are fully documented in the specifications.
- Conduct a commissioning focused Document Review at various stages during the design development.
- Develop the Commissioning Plan.
- Generate the Pre-functional Check Lists and Functional Testing Methodology.

### **Commissioning Requirements**

The CxA works with the design team to develop the Commissioning Requirements for the specification. The Commissioning Requirements map out what is expected of the Contractors. It also, identifies the requirements for the following; static and dynamic testing, air & water balancing, training and demonstration, O&M manuals and as-built documentation.

### **Document Review**

The CxA will review the specifications and drawings at various milestones during the design stage. It is most beneficial at 90% and again at 100% or just before the time of tender. The review is completed from a commissioning point of view.

### **Commissioning Plan**

The Commissioning Plan is a comprehensive document that organizes the construction and commissioning teams and assigns the associated responsibilities to each member. The Plan includes for all stages of construction and expands on the commissioning specifications.

### Pre-functional Check Lists

The Pre-functional Check Lists ensure each piece of equipment associated with each system is installed correctly, statically tested and ready to be started up in preparation for functional testing.

### Functional Testing Methodology

Functional Testing ensures the complete system has been verified and put through its paces. A file is generated for each system, be it a chiller plant or air handling unit, to track that all items have been completed. Items included but not limited to are:

- Pre-functional testing completed
- Water and air testing and balancing completed
- Each sequence of operation verified

The above documentation assigns the responsibility to each of the team members; Owner, Architect, Consultants, CxA and Contractors. This sets the foundation for the commissioning process. It is imperative to have solid documentation in place to ensure a successful process.

### **Construction Stage**

At this stage of the project, the Commissioning Process is mapped out. It is the responsibility of the CxA, with the assistance of the design team to oversee the process and monitor the progress.

The CxA will conduct the following:

- Chair Commissioning Meetings.
- Review Contractor Submittals
- Review Installations
- Witness the Pre-functional Tests
- Witness the Functional Tests
- Develop the Systems Operation Manual
- Review the Operation and Maintenance Manuals
- Oversee the Training and Demonstration to the Owner's Staff

### **Post Construction Stage**

During the final stage of a project or the Post Construction Stage the following items are performed by the Cx A:

- Conduct seasonal testing on all mechanical systems
- Review deficiencies from previous commissioning reports
- Review operations logs
- Review concerns as noted by the building operators

Building Commissioning is a comprehensive program that starts at the Pre-design stage and continues through construction into the first year the building is occupied. It is a well-

documented process that ensures the Owner's requirements are met and the building systems are operating as intended. The success is dependent upon a team approach. A successful commissioning program contributes to the performance and lifespan of a building project.

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