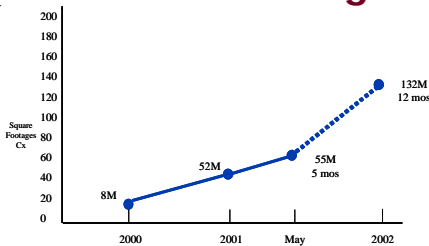




Why Healthcare will Lead the Commissioning Revolution by John P. Gromos, P.E.

Growth of Commissioning



Commissioning (Cx) is becoming more commonplace in the design and construction industry, and if you haven't already been exposed to the Cx process, odds are you will soon.

The growth of Cx and its positive impacts continue to become better documented, and as more facilities experience the numerous benefits of Cx, the trend of growth will continue. The growth will specifically increase in the healthcare sector as more projects follow the recommendations of the 2001 Edition of *Guidelines for Design and Construction of Hospitals and Health Care Facilities* (Chapter 5, Appendix A5.3). In the last two years, the amount of building square footage commissioned in the United States has increased almost 700%, but this represents only 0.1% of occupied building square footage.

Simply stated, Cx is a formal process documenting that building systems are functionally tested and fully operational (as designed by the A/E team, based on the owner's project requirements) *before* the building is turned over to the owner. This is critical for healthcare facilities that have strict environmental conditions (temperature, humidity, pressure relationships, levels of filtration), complicated controls, and complicated building systems. System or equipment downtime means potential patient safety concerns, lost revenue, dissatisfied patients, and/or dissatisfied staff (doctors, nurses, technicians).

The Cx process was created and has evolved in response to building owners who were having numerous problems with MEP systems *after* building turnover, and during the warranty period. Further, facility operators are faced with many challenges: reduced operating budgets, increasing operational expenses, and reduced O&M staff. Typically maintenance staff resources are minimal, and they don't have time to work out system 'bugs' or to finish construction after turnover. Maintaining components, equipment and systems to the satisfaction of patients and building staff is a full-time effort in itself.

If you have had (or are currently having) problems with your building(s), you are not alone. In a study of 60 buildings conducted in 2000 by Berkley National Labs, it was determined that:

- Building performance improved
- Systems operate at designed efficiencies
- Annual energy costs were reduced
- User complaints decreased
- Higher quality building
- Building turnover was smoother
- Construction warranty callbacks were reduced
- Training/operator knowledge increased
- Building documentation was more accurate
- Owner satisfaction increased
- 50% suffer controls problems
- 40% suffer HVAC problems
- 15% have missing equipment
- 25% FMS/econ/VFDs don't function
- 60% of insurance claims = HVAC
- #1 source of complaints = HVAC

Study of 60 new bldgs by L. Berkeley National Lab

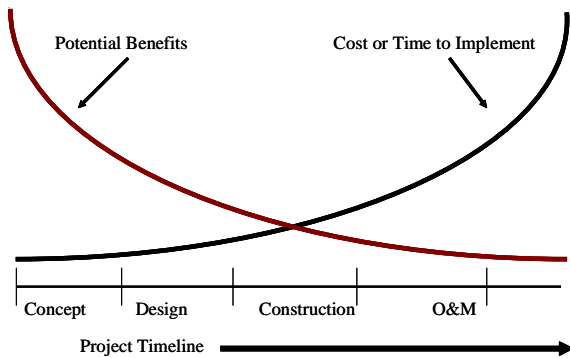
In addition to documenting completion of construction and the integration of building systems, the Cx process has been proven to reduce energy costs because the systems are demonstrated to operate at their designed efficiencies. As hospitals operate 24/7, the energy costs are significant, and the penalty for inefficiency is high. It is well documented the Cx process maximizes efficiencies/savings and the payback for Cx fees can be less than 2 years.

Typical Building Saves \$3-10 for every \$1 spent on commissioning

- Lower 1st costs due to improved scope definition
- Constructability
- Maintainability
- Operation
- Energy Efficiency
- Occupant productivity
- Liability

Reduction in construction costs is another one of the major benefits of the Cx process. Regardless of how well a project is designed and coordinated, problems will inevitably surface. It is well documented that the earlier problems are identified, the greater the impact to the project and the less expensive the resolution to make repairs.

Potential Savings vs. Project Schedule



This graph supports the introduction of commissioning services early in the design process, when its benefits have the most impact. The primary role of the Cx Authority (CxA) during design is to document the owner's project requirements (OPR), also referred to as the design intent. Throughout the design process, the CxA should review the design to make sure it complies with the OPR. The OPR is a living document and may be modified during design. It is intended to focus on the overall design, construction and operational goals of the owner, to clearly state facility design standards, and to identify special design and operational considerations the design team needs to incorporate into the contract documents. The CxA will also perform a plans review during design. The review will focus on constructability, commissionability and maintainability of the building and its systems. The design phase commissioning plans review is not a design review, and if a third party independent design review is desired, it should be executed as a formal peer review.

Facility owners and operators are realizing the positive impact the Cx process provides to staff training and development. Knowledge and understanding of the installed systems and how they were designed to be operated have a great long-term impact on both operating and

maintenance expenses. The benefits of staff training are not limited to new construction/expansion projects only. Retro-commissioning, defined as the commissioning of a building and its systems *after* the building has been occupied for a period of time, greatly increases O&M staff awareness and understanding of system operation. The key here is *system* operation, not the individual components or pieces of equipment, but how the components most efficiently operate together to reduce energy costs. Many firms (consulting engineers, contractors, test-and-balance companies) are now providing Cx services. As Cx services grow, so will the number of providers. ASHRAE is currently reviewing a final draft of Guideline 0 – The Commissioning Process, which will be the foundation for Total Building Commissioning Process for both NIBS and ASHRAE. The Building Commissioning Association (BCA), a national organization that promotes building commissioning practices that maintain high professional standards, and fulfill building owners' expectations, is in the process of establishing criteria to certify the qualifications of Cx providers. AABC, NEBB, AEE and other organizations are also developing certification criteria. Until an accepted certification process is determined, look for Cx providers who:

- Have successfully provided Cx services of similar size/complexity in the past year (be sure to *check references*!).
- Have specific healthcare design, construction and operations experience.
- Have experience in quality processes.
- Are knowledgeable in building operation and maintenance, including O&M training.
- Have excellent verbal and written communication skills, are highly organized, and have the ability to work with the A/E team, management, and trade contractors.
- Assign a registered professional engineer (P.E.) as the lead CxA on the project, who has depth of experienced personnel to support the CxA.

In summary, the Cx process can improve the systems performance of your building, reduce construction costs, reduce operation and maintenance expenses, facilitate a smoother building turnover from the contractor, and increase operator training. The Cx process can increase patient safety, patient satisfaction, staff satisfaction, and help provide you with a higher quality building systems operation.

