Commissioning: What’s Working, What’s Not?

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Introduction

First real job after college: HVAC Technician
Second Real Job:
School District M&O Director for 9 Years
During that time, something interesting happened.
Just Paid 12 Million for our New School, Who Verifies the Building Systems Work?

• Designers? Not typically in their scope of work to verify their designs perform per intent.
• Contractors? “You have a one year warranty, call us if it doesn’t work”.
• Code Inspectors? Specific code related issues only. No testing of performance.
• So it ends of being a trial and error process by the Owner’s M&O people, typically after occupancy. There must be a better way!
So I Started a Cx Firm out of my Basement in 1996 – And it Grew Up!
Around 2001 and Soon After...

• Building Commissioning Comes of Age

• Washington State Mandates Cx, CR, & VE for all Major School Projects

• LEED Embraces Commissioning – Makes Fundamental Cx a Pre-Requisite

• After 15 Years in the Cx Business, I sold out and retired (well, almost retired).
How Did I Get to This Conference?

• Current KBA business owner’s wanted to explore ways to better serve the school commissioning market.
• I suggested a survey to gauge the success of the Cx process on school district projects and look for ways to improve delivery.
• We created a survey and sent it out to about 1000 people with various roles on school projects including Owner’s, O&M staff, Project Managers, AEs, Equipment Suppliers & Commissioning Authorities.
• The following presentation represents the results of that survey and some thoughts about how we might improve the Cx process on school projects.
In your experience, what impact has the Cx process had on the delivery of buildings?

- Positive: 79%
- No Impact: 10%
- Negative Impact: 5%
- I don't know: 6%
Commissioning is Popular

• 80% feel Cx had positive impact on their projects.

• Conclusions & Suggestions:
  – Cx has seemingly earned a legitimate place in the school project delivery process.
  – Some level of formal Cx is likely appropriate and warranted for all school district projects.
For best results, the CxA should join the project team during:

- Predesign Phase: 30%
- Schematic Design Phase: 12%
- Design Development Phase: 26%
- Construction Document Phase: 16%
- Construction Phase: 6%
Earlier Seems Better

• The majority (72%) of respondents favor introducing formal Cx procedures prior to the start of construction.

• Conclusions & Suggestions:
  – Choose and hire a Cx Authority early.
  – Allow time to develop and foster a cooperative atmosphere between the Cx people and the design people. You need a team approach.
  – Schedule charrettes dedicated to discussing how to best commission the various design features.
OPR Questions

• The next three survey questions relate to the Owner’s Project Requirements.

• An OPR document is typically created to convey the general and sometimes specific aesthetic, operational and performance requirements the owner is looking for.
In your experience, are the Owner's Cx expectations and project functional requirements clearly defined and communicated to the CxA and project team?
In your opinion, how important is it to develop an OPR document to clearly define the specific desired construction and performance requirements for the project prior to the start of design work?

- Very Important: 61%
- Helpful, but not critical: 35%
- Not necessary: 4%
On projects you have participated in where a formal Cx process has been followed, is an OPR document typically produced prior to the start of the design work?

- Always: 12%
- Occasionally: 68%
- Never: 20%
The OPR Process Still Needs Work

• While the majority of project participants believe an OPR is important, often the OPR is not produced.

• Conclusions and Suggestions:
  – It is critically important that the owners clearly convey their project expectations prior to the start of design work. Take the OPR seriously and collaborate.
  – The designer’s “Basis of Design” document needs to address every requirement of the OPR document and the Cx process is then developed to confirm that all requirements have been met. All steps need to be completed or the Cx process breaks down.
  – The OPR is best developed as a collaborative effort between the design team, the Cx authority and the owner’s appropriate representatives.
Design Team and Cx

• The next three questions relate to the relationship between Cx and the design team.
Select which of the following options you feel most correctly completes the statement, 'Cx during design…'

- Enhances the project: 79%
- Disrupts the project: 3%
- Makes no difference to the project: 7%
- I don't know: 11%
In your experience, do design teams do a good job of supporting and participating in Cx?

- Yes: 24%
- Sometimes: 57%
- No: 15%
- I don't know: 4%
In your experience, do the design team contracts adequately support their Cx roles and responsibilities?

- Yes: 16%
- Sometimes: 21%
- No: 6%
- I don't know: 57%
Involve Designers More in Cx

• The majority of respondents seem to feel that designers only sometimes fully support and participate in the Cx process.

• Conclusions and Suggestions:
  – Involve (Integrate?) the designers in developing and participating in the Cx process to verify their system designs meet the OPR and BOD requirements.
  – Include specific Cx related tasks within the scope of work the designers are contracted for and compensate them for this participation in the Cx process.
Commissioning Specs

• The next three questions pertain to the commissioning related specifications that are provided within the project documents.
In your experience, are Cx requirements and processes adequately specified in the contract documents?

- Yes: 32%
- Sometimes: 51%
- No: 14%
- I don’t know: 3%
In your experience, are the Cx specifications understood by the construction team?

- Yes: 17%
- Sometimes: 69%
- No: 10%
- I don’t know: 4%
In your experience, are Cx specifications enforced?

- Yes: 33%
- Sometimes: 50%
- No: 13%
- I don't know: 4%
Cx Specs & Enforcement Need Work

• Most of the respondents feel as though the Cx specifications are not always adequately communicated to the project team or enforced during the project.

• Conclusions and Suggestions:
  – Some level of Cx process “education” needs to take place for the project team. Many project team members still do not necessarily recognize participation in Cx as part of their responsibilities.
Construction Contractors and Cx

• The next two questions pertain to the contractors and their relationship to the Cx process.
Select which of the following options you feel most correctly completes the statement, 'Cx during construction...'

- Enhances the project: 91%
- Disrupts the project: 6%
- Makes no difference to the project: 3%
- I don't know: 29%
In your experience, does the construction team collaboratively participate in the Cx process?

- Yes: 30%
- Sometimes: 61%
- No: 8%
- I don't know: 3%
Cx During Construction Deemed Valuable by Nearly Everyone

- 91% of the respondents feel at least some level of commissioning enhances the construction phase of the project.

- Conclusions and Suggestions:
  - Once again, this data seems to validate the perceived value of commissioning to enhance the likelihood that systems will be installed correctly and will operate better if some level of commissioning is provided during the construction phase.
  - Contractors need to fully understand their specified obligations to participate in the Cx process.
Who do you feel is the most appropriate choice for developing and leading the Cx process?

- An independent Cx services provider firm: 53%
- An owner's employee with Cx training: 23%
- A design team member with Cx training: 15%
- A contractor's representative with Cx training: 9%
Independent Cx Authority is Best

• Apparently the majority of our respondents slightly favor using a commissioning authority that specializes in the practice of Cx and is fully independent.

• Conclusions and Suggestions:
  – Commissioning can and often does discover issues that are directly linked to design and installation mistakes. It is important that the resolution of these issues is not potentially impaired by conflicts of interest.
  – The owner should not overlook the obvious advantages of at least formally including their employees on the commissioning team.
Issue Resolution

• The next two questions relate to the resolution of issues discovered during the commissioning process.
In your experience, are the issues discovered during Cx generally resolved, or are a significant number of them left unresolved at the close of a typical project?

- Most issues resolved: 87%
- Most issues unresolved: 9%
- I don't know: 4%

The pie chart visually represents these percentages.
In your experience, is the Cx process typically completed in a reasonable amount of time?

- Yes: 65%
- For the most part: 16%
- No: 16%
- I don’t know: 3%
Issues are Getting Resolved

- According to our survey, most of the respondents feel as though the majority of commissioning issues discovered are resolved and in a reasonably timely manner.

- Conclusions and Recommendations:
  - Apparently there is a fairly high level of satisfaction with the issue resolution process on most projects.
  - A good way to screen potential Cx providers might be to ask for samples of issues and resolutions from their past projects. An organization like A4LE might even sponsor a study to collect issue and resolution data from past school projects in order to identify common and reoccurring issues and their potential resolutions.
M&O Involvement in Cx

• The next two questions deal with the level of involvement in the Cx process by the owner’s M&O staff.
In your experience, are the Owner's Maintenance and Operations related staff adequately integrated into the Cx process?

- Yes: 49%
- For the most part: 34%
- No: 11%
- I don't know: 6%
In your experience, does Cx assist in turnover efficiency and effectiveness (help provide operating information)?

- Yes: 37%
- For the most part: 38%
- No: 19%
- I don't know: 6%
Get M&O Staff More Involved

• Our survey data would indicate that the owner’s M&O staff are not being adequately integrated into the project Cx process.

• Conclusions and Suggestions:
  – Owner’s need to understand the importance and real value of integrating their M&O staff into the commissioning process.
  – The need for specified training by the contractors at project completion can be greatly reduced by involving M&O staff through the entire Cx process.
In your experience, does Cx save operating costs?

- Yes: 49%
- For the most part: 33%
- No: 8%
- I don’t know: 10%
Cx Saves Operating Costs

• The majority of our survey respondents feel that Cx saves the owner in operational costs.

• Conclusions and Recommendations:
  – Cx can save money in operational costs when the process discovers and resolves issues related to excess energy usage and defective system components (leading to premature system failures).
In your experience, does Cx reduce warranty issues?

- Yes: 40%
- For the most part: 35%
- No: 15%
- I don't know: 10%
Warranty Issues Reduced

• 75% of our survey respondents believe Cx reduces warranty issues.

• Conclusions and Recommendations
  – It is only common sense to understand you will reduce the number of warranty issues if you resolve the majority of issues prior to project completion and acceptance.
  – The owner and project managers need to continue supporting the Cx process through the final resolution of all issues.
Some Final Recommendations

• **Owners**: Develop a comprehensive OPR document and make it clear to your designers, project managers and contractors that you expect the Cx process to be fully supported through their contracts with you.

• **Designers**: Communicate with the Commissioning Authority early and often. Collaborate on the testing process and make commissioning work for everyone.

• **Contractors**: Review and fully understand your contract requirements related to Cx. Communicate your issues to the CxA early. A good Cx process reduces call-backs!

• **Commissioning Authorities**: Work like a project partner, not an outside inspector. Build collaborative relationships and support everyone’s efforts.
U of Wisconsin Course – June 12-14

The Commissioning Process for Design-Build and IPD

• Learn to apply the ASHRAE Commissioning Process to projects using different delivery models. Discover how commissioning tasks must be modified for each phase of a project, using example projects that follow design-build and integrated project delivery (IPD) methods.
Thank you!

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