Building Commissioning as an Insurance Loss Prevention Strategy

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ABSTRACT

Insurance companies for design professionals pay millions of dollars in HVAC-related claims each year. DPIC is the second largest insurer of design professionals in North America. Their study of these claims indicates that building commissioning could save significant claim payment dollars.

Commissioning—as an integrated, fundamental building/design/construction/operation process improvement—has the potential to improve the design process, the quality of design, and building performance. Improved building performance not only reduces the likelihood of professional liability claims, it also improves owner satisfaction and user productivity, which in turn builds the reputations of architects and engineers.

Recognizing that commissioning could improve claims statistics, this design professional insurance company conducted the following studies:

- A telephone survey of 40 insureds to assess policyholder understanding and interest in building commissioning.
- Focused discussions with two groups of insureds (one group of architects and one of engineers) to get their feedback on the concept of commissioning and potential claims-reduction program options.
- An investigation of closed claims files to assess the degree to which commissioning could mitigate claims.

This paper will review the results of these studies and discuss the insurance company's plans for promoting commissioning as a loss-prevention strategy for its policyholders.

Introduction

Building commissioning is a systematic process that includes documenting design intent, performing functional tests to determine whether building systems[1] meet this intent, and documenting the results of these tests in a report to the owner. Commissioning goes beyond standard construction activities for A/Es and beyond testing, adjusting and balancing to determine how well mechanical, electrical, and/or other building systems work together. Commissioning seeks to define a facility's operational goals and determine whether the equipment and its integrated installation meets these goals or whether it needs to be adjusted to improve overall performance. DPIC, a national insurer of design professionals, and PECI (Portland Energy Conservation, Inc.) see commissioning as a means to improve the quality of building design and performance, which can result in increased owner satisfaction and reduced claims against architects and engineers.

[1] Although commissioning is most often discussed as applying to HVAC systems, owners and industry professionals are also finding it to be a valuable quality assurance tool for electrical systems, building envelope, plumbing, telecommunications, and security systems.

Throughout the country owners, architects and engineers are recognizing the benefits of building commissioning:

- Improved system performance
- Improved operation and maintenance
- Improved indoor air quality and thermal comfort
- Improved energy efficiency

DPIC and PECI see another advantage of building commissioning for architects and engineers: building commissioning is likely to reduce claims.

Between 1990 and 1994 DPIC paid out more than $26 million in claims for heating, ventilation and air conditioning (HVAC) related problems (Brady 1996). According to legal experts, this outcome is hardly surprising. The traditional design and construction process suffers from many flaws (Tyler 1995):

- HVAC system designers often must try to meet conflicting design criteria
- Designers and installers rarely have the opportunity to work together to adequately and proactively address site constraints that may have been unknown at the time of design
- Owners and designers are often willing to sacrifice operability and maintainability (thus potentially increasing long-term costs) in order to reduce first costs

Commissioning can mitigate these problems by requiring clear and written design intent, verifying that the installed system meets design intent, facilitating communication among project team members, and addressing operation, maintenance, and training issues early on in the project process and through to occupancy. Commissioning also involves documenting system performance, a practice that can provide designers with a defense against performance-related claims.

In 1996, DPIC hired PECI to ascertain whether a building commissioning program could be valuable for DPIC and its policyholders, and lay the foundation necessary to develop the approach and substance of a successful program. This study involved the following steps:

- A telephone survey that established the extent of present understanding and use of commissioning practices among DPIC's design professionals.
- Based on the results from the telephone survey two focus groups were convened, one for architects and one for engineers. The focus groups were designed to develop program options in more detail and provided an in-depth discussion on possible program barriers.

Following this initial study, DPIC conducted an internal review of its closed claims files to determine whether and to what extent commissioning might have mitigated these claims. This study found that commissioning could have had a significant impact on claims. DPIC is now in the process of defining commissioning program options.

Telephone Survey

PECI assisted DPIC in developing a telephone survey (Portland Energy Conservation, Inc. 1996) to assess the level of familiarity with commissioning and interest in potential DPIC program options among architect and engineer policyholders. Two survey paths were developed. The first track was designed for the policyholder familiar with building commissioning. It allowed the respondent to share details regarding the firm's experience with building commissioning. A second

path was developed for respondents who were unfamiliar with building commissioning. This second path provided a more detailed description of building commissioning before asking the respondent to answer questions. Each respondent was asked approximately 20 questions, 4 of which were demographic in nature. These demographic questions were used in the analysis to link types of responses with characteristics of the respondent.

Survey Sample

DPIC provided the names of 80 policyholders from which to draw a total sample of 40. The sample was chosen using several criteria including firm size, annual fees of $500,000 or more, participants in DPIC premium credit programs[2], and located in areas of the country where building commissioning activity is greatest. The target sample was 20 architects and 20 engineers based in California, Oregon, Florida, Illinois, Texas, New York, Massachusetts, Hawaii, and Iowa.

Analysis Results

PECI recorded survey data in a MiniTab database. Because of the small sample size and limited nature of the survey, analysis was limited to frequency counts and cross tabulations. After the data was analyzed, we were able to make the following observations:

- Slightly more than 80% of the respondents were at least somewhat familiar with the concept of commissioning. Engineers tended to be more familiar with commissioning than architects.
- 42% of the respondents had been involved in a commissioning process. This is a larger percentage than we might have anticipated. However is should be noted that most respondents had a broader definition of building commissioning (that is, a focus on overall quality assurance) than the one offered in the survey. Again, engineers were more likely than architects to have been involved in a commissioning process. Of the respondents with commissioning experience, 70% were engineers and 30% were architects.
- More than 67% of the respondents work at firms employing 20-100 people.
- 75% of respondents work at firms that billed $1 - $5 million in fees during 1995.
- The majority of those interviewed (77%) held positions of high responsibility (principals, presidents, partners, directors) in their firms.
- 95% of the respondents would be willing to track appropriate information to receive a premium credit. Of those willing to track information, 18% felt it would depend upon the tracking requirements and the credit available.
- The majority felt that a significant barrier to commissioning is selling the benefits to owners. Respondents suggested that marketing materials including owner testimonials and quantifiable benefits be developed for owners.

[2] DPIC offers voluntary programs to help its policyholders minimize claims on their projects. Participants in these programs often receive a credit toward their premium costs.

Respondents with Commissioning Experience

Of the respondents who had commissioning experience (42%), the following results were found:

- 53% (20% of the total sample) felt that very few or no new buildings are being commissioned.
- 60% (22% of the total sample) felt that all mechanical and electrical systems should be commissioned. Several respondents commented that commissioning should go beyond mechanical and electrical issues and address structural and other concerns as well.
- 93% (35% of the total sample) said their firms have commissioned less than half (20%), very few (60%) or none (13%) of their projects in the last two years.
- By far the greatest barrier to commissioning, stated by almost every survey respondent, is that current fees do not cover the cost, which must be passed on to owners.

Of the reasons listed by the interviewer that firms commission their projects, most respondents saw ensuring building performance as the purpose of commissioning. Other reasons were fairly evenly split, as shown in Figure A, with energy savings the least likely reason.

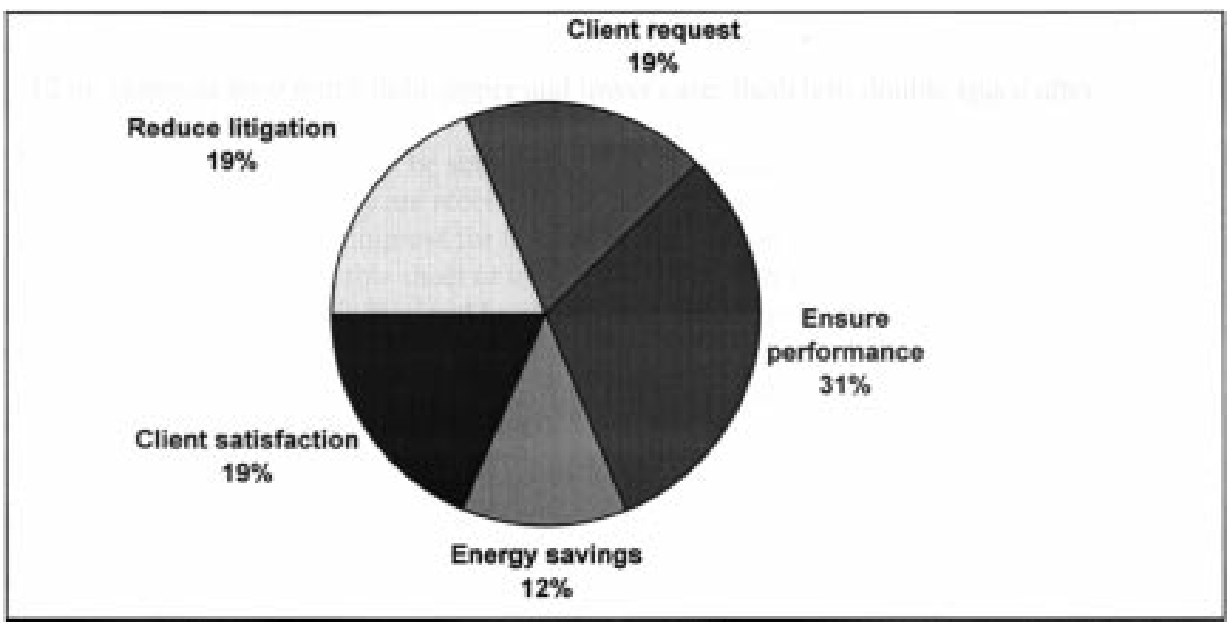

Figure A: Reasons to Commission from Respondents with Commissioning Experience[3]

[3] These percentages are of the 42% of respondents with commissioning experience. When the numbers are calculated against the entire sample, 25% list ensure performance as the primary reason for commissioning; 15% list reduce litigation, promote client satisfaction, and client request—each—as the primary reason; and 10% list energy savings as the primary reason.

Respondents without Commissioning Experience

The respondents who were unfamiliar with commissioning or did not have commissioning experience were given additional information about building commissioning that included a more detailed definition and a list of potential benefits of building commissioning. These respondents were then asked to rate their level of interest in the concept. All of the respondents without commissioning experience were interested in learning more about commissioning with 72% being very interested.

Respondents felt that most of the benefits of commissioning were attractive as shown in Figure B. They were most interested in the potential for commissioning to reduce liability, followed by its potential to improve customer satisfaction and identify discrepancies early while contractors are still on the job.

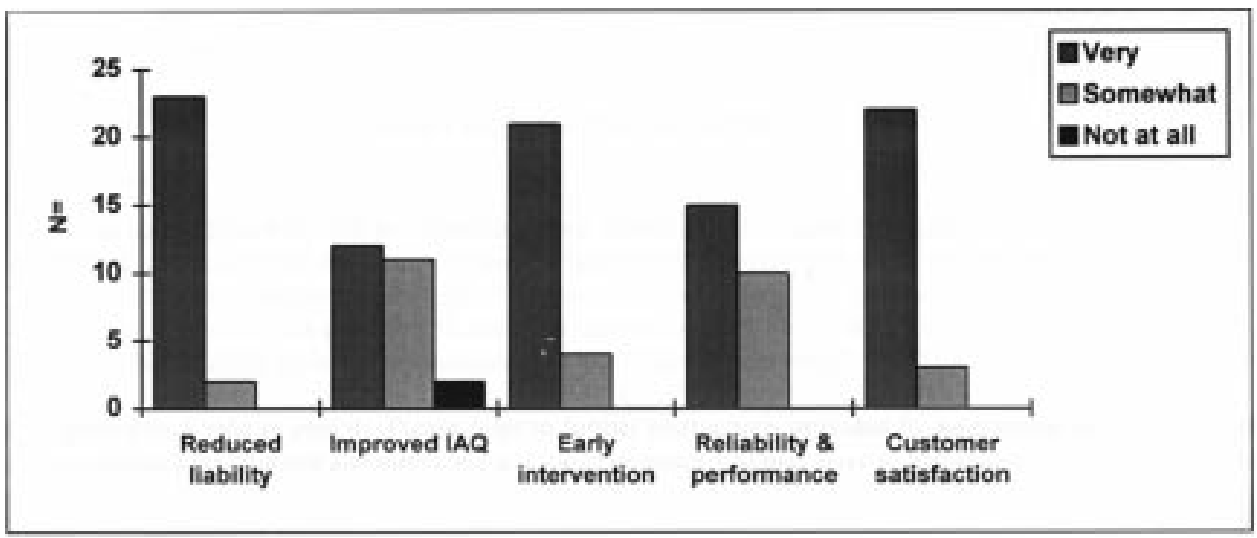

Figure B: Interest in Commissioning Benefits From Respondents without Commissioning Experience

Focused Discussion Groups

Once the survey results were analyzed, PECI developed preliminary program options. These options included a two-tier commissioning program. The first tier proposed incorporating commissioning into DPIC's Professional Liability Education Program elective courses and workshops. The second tier offered an additional premium credit for policyholders who commission their projects.

The purpose of the focus groups (PECI 1996) was to present the results of the telephone interviews and to get policyholders' opinions on commissioning. The discussion groups also provided an atmosphere that allowed the policyholders to elaborate on the survey questions and discuss commissioning with their peers. Two focus groups were conducted with participants invited by DPIC: one with engineers and one with architects.

The focus groups were designed to be organized discussions facilitated by PECI with support provided by DPIC. PECI developed a script to serve as a guide and to provide prompts for the

discussion leader. The focus group script was used for both the architect and engineer sessions. The focus group leader provided participants with background on building commissioning and an overview of the telephone survey results. The following discussion addressed their interest, experience and expected role in the commissioning process and elicited feedback on the preliminary program options.

Focus Group Results

Throughout both focus groups one point was made clear—architect and engineer interest in building commissioning is high. However, for building commissioning to truly become common practice with these groups, clear role definition is needed. The architects and engineers indicated that their ideal role in commissioning should be flexible enough to allow variation by project and owner. They were less clear on the details of roles and how the two disciplines will work together to define roles. In addition, a recurring discussion for both focus groups centered on the role, appropriateness and liability of involving a third party in building commissioning. While there was no resolution, it is evident that the role of third party commissioning agents must also be defined.
Focus group participants also expressed interest in the following commissioning "tools":

- Standard language for including commissioning in contracts
- Guide commissioning specifications for inclusion in bid documents and overall project specifications
- Marketing materials directed to owners
- Commissioning guidelines describing the commissioning process and the roles and responsibilities of each party involved. (A few participants in the engineers' group were aware of the ASHRAE Guideline for the HVAC Commissioning Process.)

Barriers to Building Commissioning

When asked to describe the barriers to building commissioning both groups cited the need for owner education. Fee reductions over the past two decades have shaved services like commissioning from the traditional design and construction process. Currently owners assume that building commissioning services are still part of the scope of work and there is strong resistance to pay an additional fee for the service. Education is required to help the owner understand the value of building commissioning and to associate an appropriate fee with the service. The other main barrier discussed was a concern that building commissioning may increase liability if a project is commissioned and problems later arise.

Closed-Claims Investigation

Based on the results of the telephone survey and the focus groups, it appeared that commissioning could prevent or mitigate claims for DPIC policyholders. In order to further test that assumption, DPIC recently conducted a study of 44 of its HVAC-related closed claims. The 44 claims totaled $18.4 million (not including A/E time and expenses to defend against the claim nor the A/E's deductible) paid on behalf of architect and mechanical engineer insureds. In addition to the $18.4 million in damages paid by DPIC, other parties (building owner, other design team members, etc.) involved in the lawsuit paid out $7 million on these 44 claims.

The study found that claims were made for two reasons: to remedy HVAC problems or to recoup economic losses. In each of the 44 claims, coordination among the team members was a problem. Another primary problem was changes in specified equipment during construction (Thomson 1997). When commissioning is incorporated into projects from programming through occupancy, such problems can be solved before buildings are turned over to owners, thus preventing potential claims. Commissioning providers are specifically charged with facilitating coordination among team members and tracking project specifications from design through construction and into operation. PECI's experience in buildings and discussions with other industry professionals indicate that many of the problems that resulted in these 44 claims are not atypical.

Claims reviewed included the following (Thomson 1997):

- Several school claims with numerous HVAC problems, such as overheating, underheating, inadequate air distribution, inadequate ventilation of labs.
- At one nursing home, 30 problems were discovered, including poor indoor air quality resulting from undersized vents and insufficient air handlers. In addition, air conditioning units failed. The settlement for this claim totaled $282,774.
- At a residential condominium, insulation was not installed as designed. The facility suffered severe heating problems. The total settlement for this claim came to $925,000.

The average settlement was $584,113, or approximately one percent of the construction cost for each building. Some commissioning experts hold that as a rule-of-thumb, commissioning costs approximately one percent of the total construction budget. In other words, had the average settlement amount been spent up front on commissioning, the system probably would have operated properly and all parties involved (the owner, designer, other contractors, and DPIC) could have avoided the time-consuming and expensive claims process. But (thankfully) few projects ever end up in a design claims situation. For those projects, investment in commissioning is "often cost effective based on energy savings alone (Piette et al. 1994)." In addition, commissioning may save owners even more money by preventing IAQ claims, reduce long-term operation and maintenance costs, and possibly improving occupant productivity by improving building comfort.

Minimizing claims benefits owners, designers, and design professional insurers. Insurers set premiums based on expected claims. If they have confidence that firms employing commissioning end up with fewer project claims, insurers would consider reducing premiums for these firms. This, in turn, allows these architects and engineers to compete more successfully for these projects.

Next Steps

DPIC plans to develop an education program to encourage its policyholders to commission their projects. They intend to develop recommended contract wording for including commissioning in A/E contracts. The company will continue to publish and present its findings at conferences and seminars and will work with other organizations to provide commissioning information to building owners. In addition, DPIC has added a "Building Commissioning" category to its professional liability insurance policy application. Data provided here will eventually allow them to compare future claims findings between firms with and without commissioning experience (Thomson 1997).

DPIC currently offers a 10% premium credit to firms implementing a "loss prevention improvement project." Certainly firms that adopt commissioning as a practice improvement and

demonstrate commissioning expertise would qualify to receive this credit.

Additionally, DPIC is participating in a consortium of interested stakeholders to develop training and education about commissioning for building owners and design professionals.

Conclusion

Although time will tell, it already seems likely that by encouraging its policyholders to commission their projects DPIC will reduce the severity and frequency of HVAC-related claims. In addition, as the International Performance Measurement and Verification Protocol (IPMVP) (Kromer 1996) expands to define measurement criteria for factors such as IAQ and productivity, DPIC and other insurance companies may find even more reason to advocate that their policyholders commission their projects.

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