

Commissioning Services Can Reduce Professional Liability Losses

Roger Brady, AIA

Manager, Loss Prevention Education, Architects Division, DPIC Companies, Inc.

Synopsis

Owners say they want a "high performance" building, more than a "design statement." Architects' priorities seem to be almost the opposite. As a result, HVAC claims are raised from this apparent mismatch of expectations and concerns.

The enhanced Scope of Services,(becoming) commonly referred to as Commissioning (Cx), offer those owners the kind of attention, analysis and rigorous involvement they expect of architects and engineers toward the important building performance outcomes they seek. Yet, too often, those same owners neglect to factor increased effort into their professional service fee budgets. Commissioning addresses and begins to deliver on the critical concerns many owners hold about building performance and buildings as "machines."

The bottom line for owners who *invest* in building commissioning services — throughout the entire design and delivery process — is additional long- and short-term returns on that investment. The very large quantifiable and subjective returns that accrue to the smart client can include: reduced energy consumption, reduced operating costs, more flexible/adaptable systems, equal or better system performance, improved comfort, health and productivity of users, and finally, higher market value. While these benefits need more specificity, they are there— conceptually for now, but evidence of their presence is emerging every day.

Others are working on numerous aspects of this emerging idea. I'll look at three independent views of the building process broadly related to commissioning, and then highlight some loss prevention approaches and resources design professionals might employ to gain enthusiasm for and competency in this important issue — a macro view for architects (and engineers), if you will.

About the Author

Roger Brady, AIA is Manager, Loss Prevention Education of the Architects Division at DPIC Companies, Inc. in its Monterey, California headquarters. Prior to joining DPIC in September, 1993, Roger's professional career was focused on managing design firms, capping his career in practice as the management principal of a large architecture firm. He is a registered architect in Ohio and has degrees in architecture from Ball State University and the University of Pennsylvania, and an MBA from the Wharton School. His professional interests are centered around practice management and how the improvement of this aspect of the profession can enhance the many other aspects of the profession and its place in society.

Commissioning is Loss Prevention

As an architect, and currently involved in insuring architects for their professional liability, my definition of Commissioning is somewhat simpler, or at least more focused on architects and engineers. I view it as an enhanced scope of services and deliverables that the architect and engineer provide. The client makes an up-front investment to expand "Basis Services" in order to ensure better building performance, significant life cycle cost savings, and more satisfied and productive users. That enhanced scope may start with an increased quantity and quality of questions during the programming phase; result in more energy/cost/performance analysis during the design phases; more extensive documentation of the systems in question and their expected performance; higher quality observation of the work as it is being constructed and installed; some time to explain the systems to operators; and finally, ongoing follow up to continuously improve the facility's performance and the design and delivery process for the next client. With this brief background, I hope you find these comments of interest.

First, I offer some background to help you understand the perspective offered here. DPIC Companies, Inc. — the professional liability specialist of the Orion Capital Companies — is a leading provider of professional liability insurance for architects and engineers in North America. DPIC was founded in 1971 by design professionals and has been committed since its founding to better loss prevention.

The issue of building commissioning, in its broader context, is definitely on DPIC's radar screen. We are becoming convinced that these enhanced services will have true loss prevention benefits to our insureds and to their clients. They will benefit all stakeholders in the building process — design professionals, public and private owners and developers, financial institutions, public utilities, constructors, and even professional liability insurers and society in general — if each stakeholder embraces the services as a cost effective opportunity and thinks of them creatively. Let's examine Commissioning as an idea whose time has come.

Paradigm Formulation — What's the approach?

As a professional liability insurer of architects and engineers, DPIC is very interested in loss *prevention*. We feel Commissioning (Cx) must be embraced by design professionals and thought of positively and creatively.

Virtually all leading thinkers on the topic agree that Commissioning as an isolated activity or *final approval* before a building is turned over to the owner will not work. It feels like little more than a *Quality Control* (QC) exercise or final check before the drawings are released. For example, just before the building is turned over to the owner, the commissioner discovers the chiller is 30% of what it should be. In a case like this, it may be just as expensive for all involved to fix the problem reported by the commissioning agent as it is to let the owner discover it at some point in the future. We, at DPIC, believe in the notion of *building in* loss prevention measures throughout the design process — creating a *Quality Process*, if you will — so that the likelihood of something being wrong at the end of that process is greatly reduced.

Building it in along the way versus *checking for it* at the end — as two views of Commissioning or quality, if you will — have important implications. The more *the process* itself can ensure that requirements are met, the less checking will be required later. Importantly, the checking and verification aspects of Commissioning (or any quality control *check*) as a final activity will always have a place. Rather, the better path calls for increasing reliance on Commissioning as an integral part of a *design process improvement* to assure quality and high performance. Commissioning as an after-the-fact *procedure* of checking for minimum compliance would simply be business as usual. Commissioning as an *ever improving, integrated, and fundamental design and build process* will make it *better* than business as usual. That's the way I'd like to see it take shape for design professionals and all others in the design and build loop.

Owners' View

First, we need a demand or market, if you will, for any idea. Findings from a national survey of owners and clients in business, health care, education and non profit organizations suggest there is pent up demand for Commissioning. The Roper Organization conducted a survey for The American Institute of Architects released in 1994.¹ Using 800 phone interviews, these owners/decision makers were asked to "list your priorities in planning a renovation or new construction project." These clients felt their building should function as an efficient "business machine." When asked to identify the level of priority which they would place on certain design issues or elements, here's what they said:

- 95% placed a *highest priority* on fire and life safety systems,
- 90% thought the **quality of the air** in the facility was a *highest priority*,
- 90% felt the [spacial] **efficiency** of the facility was a *highest priority*,
- 89% also thought the **energy efficiency** was a *highest priority*,
- 88% felt **lighting** was a *highest priority* also, and
- 78 % thought **life-cycle costs** should be included in their *highest priority* list.

Only 66% of that same group felt the building's **design statement** should be on the *highest priority* list, and only 64% felt **how it fits in with its surroundings** was a top priority.

This represents a very clear and interesting set of expectations that these diverse owners share. There appears to be a need/desire or market for Commissioning! Next: the vantage point of the architect.

Architects' View

How do architects view the various professional activities they perform? The most comprehensive study published to date — *Current Architectural Practice*² — was released in 1989 by the California Board of Architectural Examiners and the testing firm CTB/McGraw-Hill, Monterey, California. The findings were used to develop a new California Architects Registration

¹Assessing Architects & Their Services Copyrighted 1993 by
Roper Starch Worldwide 205 E 42nd St. New York, New York 10017 212.599.0700

Examination. Based on their own professional experience and expertise, the California architects surveyed were asked to rank the importance of 406 aspects of practice, organized according to the nine categories of the architectural registration exam. Each aspect was rated for *criticality* to the protection of the public health, safety and welfare and for *frequency* of use in everyday practice. These two factors were combined to produce an *importance* rating for each item. What emerges is a clearer understanding of the practice of architecture, from the perspective of architects.

The primary objectives and scope of skills and competencies for Section 4: "Life Safety/Mechanical, Plumbing, and Electrical," according to the architectural registration exam, are: "knowledge of mechanical, plumbing, electrical, and life safety systems used in buildings; ability to select systems and equipment and to evaluate their appropriateness in achieving architectural design objectives". Sounds like Commissioning services to me! So, . . .

Of the 44 aspects defining Life Safety/Mechanical, Plumbing, and Electrical: architects felt :

- None were "Extremely Important"
- 5 were "Very Important"
- 15 were "Somewhat Important" and
- 24 were "Slightly Important"

Remember what the clients wanted? The Roper survey is at absolute odds with what architects think is critical to their practice. No wonder owners are upset and architects are ultimately losing credibility, compensation and/or market share. When owners' (often objective or quantifiable) expectations aren't met, they have some cause to complain. The human comfort, health, energy efficiency and financial implications of inappropriate Mechanical/HVAC (and other building) component systems are *fundamental* requirements. This fact makes them even more serious when they are not met. Yet for all intents and purposes, these issues are low priority (officially, "*slightly important*") in architects' minds. These issues are given low priority in our architecture schools as well, far behind the all important "D"esign studio. Based on this "conditioning" during these formative years, it's no wonder practitioners often philosophically and systematically marginalize these services. Alas, before we, as architects take all the blame, I hasten to add that many of those same owners who want their design professionals to "do it right" are too often underfunding the scope and/or are inarticulate about their needs and desires until after the fact.

DPIC's View

Last but not least, look at DPIC's closed claim files for the three calendar years ending December, 1993. The "Mechanical/HVAC" component system category (versus other building components such as roofs, windows, walls, etc.) was isolated. The high expectations of owners and "low importance" placed on these issues by architects (from the cited studies) appear to have some validity across the country and have a significant consequence. These two pieces of information

²Current Architectural Practice Copyright 1989 by
California Board of Architectural Examiners
Published by CTB/McGraw-Hill a.k.a. "California Testing Bureau"/McGraw-Hill
20 Ryan Ranch Road Monterey, CA 93940 408.393.0700

— owners' expectations and architects' "interest" in these topics — present a clue to what we found in our closed claims files.

Before we look at the claims information, it should be noted that architects and mechanical engineers usually (99.9% of the time) do good HVAC work and produce (very) acceptable (if not "high performance") buildings when the owner compensates them for the activities and time necessary to do so. And the vast majority of buildings meet owner expectations to an acceptable degree, or we would have far more claims!

In spite of that big qualifier, the Mechanical/HVAC component system is the #1 contributor to our losses for architects and engineers during those three years with losses totaling over \$19 million. Additionally, Mechanical/HVAC claims are the # 1 "building component" claim type, in terms of frequency with over 500 closed claim files during this three year period. While the severity of an "average" Mechanical/HVAC claim is well down the list from claims arising from other building components, such as foundations/footings, columns, walls, etc., it is still in the "top 10" and a very serious problem in our eyes, worthy of further investigation and remediation.

DPIC and others involved in this awareness effort are trying to draw attention to these issues and at least get them on architects' (and other design professionals') radar screens. Suffice it to say, we at DPIC and our policyholders have a very direct self-interest in raising our own consciousness and competency in this area.

Here are some real world examples of HVAC claims. Not all of these are huge financial disasters, but then again, we are only measuring initial cost, or in these cases "one time, retrofit costs to get things to an acceptable level." Certainly, the life cycle costs of these (probably inefficient) installations would dwarf the outlays discussed here. Unfortunately, owners are not really focused on this issue and are, therefore, "eating" the costs.

1. A school client was presented a mechanical system that met its needs from a performance point-of-view, but cost more than had been budgeted, so the scheme was rejected for a more "cost-ineffective" solution. One year later the design professionals were sued by the owner because the mechanical system was inadequate: the building was hot in the summer and cold in the winter! Had the \$30,000 been spent for the appropriate system originally proposed, the \$80,000 paid after the fact to correct the poor decision would have been unnecessary. And unfortunately, the client also had contributory costs for the retrofit, disgruntled users and a sub-optimum building.
2. The owner of a low rise speculative office building does not want the architect to provide mechanical and electrical design. He will get the design "for free" from the mechanical/electrical subcontractor. He only wants the architect to coordinate the design with his work. As is often the case, a lot of things go wrong which the owner thinks the architect should have caught in his coordination efforts. Then the building develops sick building syndrome, as well! So the architect and his insurer pay \$150,000 AND the owner pays his share of \$175,000 to "get it almost right the second time." And, these things are always more expensive to retrofit than to do correctly the first time. The bottom line is

the "fix" has no integrated design criteria and the "design" is a "cut 'n' paste" hodge podge, using as much of the inadequate original system as possible.

3. A mechanical/electrical consulting engineering firm, expert in hospitals and clinics, is asked to design the HVAC system for a mortuary. The system servicing the embalming room was inadequate in its ability to pull in fresh air and to remove formaldehyde. The EPA requirements were neglected, as well. After complaints from sick workers, the owner filed suit. The funeral home lost the use of the space while the improvements were going on and was fortunate in avoiding any bodily injury claims from his staff. The moral of the story is that there may not have been a seasoned mortuary HVAC expert to be found locally. Yet the fee for the work assumed this otherwise competent firm could do the work. A little extra money up front could have helped the engineer get up to speed with the issues and requirements, run a computer simulation if need be, and avoid the problem in the first place. Bottom line: poor communication of the scope and need for fee from the engineer to the architect and in turn from the architect to the owner. As a result, \$50,000 was spent where 1/10th that amount could have prevented it with none of the loss of use, unhappy staff, etc.
4. The heating and cooling system for a swimming pool burns out after five years. Come to find out, the pool maintenance crew used the wrong grade of oil for the motor. Further, they failed to maintain it as called for in the Operation Manual. The owner and the maintenance crew even received the manual. But no one walked them through it and highlighted the critical things that must be done. The mechanical engineer paid \$20,000 and the owner paid \$10,000 for his share of the cause. (Arguably, the owner should have paid all of it. The owner was heard to say, "Hey, if they had told us that if we used the wrong oil, this would happen, we would have done it right." Just putting it in a manual isn't even enough. Some time to review the manual was necessary. Fees often don't allow for this level of service and, understandably everything that should happen in a perfect world doesn't always occur.
5. On a HIGH LUXURY Condo project the architect contacts a mechanical/electrical consulting engineer (ME#1) for full design services. After a delay of several months, when the project does start up, ME#1 says he is too busy now and can't start the project. The architect finds ME#2 to do full services but at the last minute, it is discovered that ME#2 cannot seal the documents on this out of state project. So the architect goes back to ME#1 to take over in the final days, literally, of the Construction Documents Phase — to check the work of ME#1 and act as the "ME of Record" for the remainder of the project. Had ME#1 had more time and fee or better quality systems, he would have discovered that the plenum was not large enough to contain the return air ducts. The resulting construction delay coincided with a downturn of the local economy and in critical foreign economies, such that the project "missed its market" and upon completion, had no ready buyers. The delay claim that resulted may well exceed the policy limits of ME#1. For the owner, they missed their market and the solution to the problem is to condition only fresh, outside air, which is more expensive to condition than return air from the interior.

All of these cases require a different solution, but more attention to some aspect of the enhanced scope of services becoming known as Commissioning would have helped mitigate or avoid each of these problems altogether. In our obsession to want things faster and cheaper, we seem to be missing the better part of the standard cliché.

DPIC and others involved in this awareness effort are trying to draw attention to these issues and at least get them on architect's (and other design professionals) radar screens. Suffice it to say we at DPIC and our policyholders have a very direct self interest in raising our own consciousness and competency in this area.

Lots of Ways to Get to the Destination

Some powerful new developments in the architectural and engineering professions will help make Commissioning a standard operating procedure — regardless of the definition. For instance, instantaneous information exchange on the information superhighway is making all manner of information available to anyone with a computer and a modem. Specifically, architects and engineers have *ALANline* and *AE&C InfoNet*, as *bulletin board systems* and nodes on that superhighway created especially for their use. Individual users can electronically discuss energy efficiency on national forums; access research data put on *the Net(work)* by various public and private sources; bench mark best practices of peers from around the country; participate in interactive computer based learning using CD-ROM or distance learning techniques from this new cyberspace library. All these vehicles will accelerate the learning curve by *any* participant in the system.

Further, the American Institute of Architects and a growing number of state architectural registration boards are requiring mandatory continuing education which will provide the professional incentive to improve practices. Owners who attend these kinds of programs will come away with increased awareness and the rationale to seek enhanced professional services from the design team. *Demand* from the marketplace is the ultimate way to create and reward a market.

To get you started, here are some loss prevention steps architects and/or engineers can take to "get up to speed" with Commissioning and commence building *a loss prevention strategy based on competence* in Commissioning.

1. Contact your local or regional utilities for information on the subject.
2. Talk with the other members of your A/E teams to understand their knowledge of the topic and their ability to deliver the services.
3. Talk with client types to better understand their perspectives, needs, desires, and expectations and to let them know of your interest and evolving competency.
4. Be careful to accurately reflect what you can and can't provide in proposals and contracts. It is probably not in your self interest to characterize your services as anything remotely resembling a warranty or guarantee.

5. Seek additional education and insight from local, regional and national sources, including ASHRAE, AIA, ACEC, NSPE, Portland Energy Conservation, Inc., the Florida Design Initiative, colleges and universities with appropriate curriculums, and emerging experts (see speakers list).

Conclusion

The costs and benefits of Commissioning are clear from the narrow vantage points discussed here. Energy, air quality and "sustainability" experts can paint a more vivid and important cost/benefit picture from their broader perspective. Owners seem to be embracing the notion of *high performance buildings*. But, are they willing to invest a little more up front for the long term savings and benefits that better analysis and design can provide. Additional financial and user satisfaction analyses will accelerate the trend. In general, these issues are not on architects' radar screens, yet. Costs of the status quo are sometimes hidden but are very high. The benefits of an improved system are *huge* for every participant in the system.

I urge you, regardless of your role in the design and construction process to make Commissioning a loss prevention strategy by *reengineering* the programming, design, delivery and operating procedures and processes that create and sustain our buildings. For design professionals, I urge you: Build it in. Improvements to existing *processes* employed by design professionals — more effective programming, analysis, design, documentation and follow up — based on enhanced learning and improved competencies in these topics can reduce the old costs and create enormous new benefits.

Perhaps a more knowledgeable, quality conscious, relevant profession driven more by *client* values and expectations will emerge. In this political, economic and social climate, any new costs of Commissioning must be paid back by looking at not only the initial cost of services and the building itself, but also calculating the life-cycle costs and understanding the subjective price that is paid for expedient, short sighted accounting versus asset management. As a result, a higher return on the investment every owner must make will accrue. Architects (and engineers) could be even more valued and receive higher financial rewards for that value. Commissioning won't limit the design statement, it will broaden our perspective and enrich the total quality of the building for its users! The paradigm shift that Commissioning represents can mean more and better work for design professionals, and better buildings for their clients, users and society; which is why most of us chose the profession in the first place.