

Construction Peer Review: A Technique for Improving Construction Practice

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The potential of the constructor peer review process is examined based on a consulting study involving three separate contractors who undertook to perform peer review analysis of their operations. The stages involving peer review are examined including planning, team selection, data development, site visit, peer review report, report implementation and secondary advantages. Important fundamentals of the peer review process including construction practice examination by non-market competition is covered along with other recommendations based on the study. Peer review as a technique is just that, a technique upon which its success depends on significant resource commitments including time by the contractor sponsor.

Key Words: Construction Operations, Construction Practice, Implementation, Peer Review, planning, process analysis, Review Preparation

Introduction

Construction has become an increasingly competitive business with heightened competition in the marketplace. At the same time, the construction industry has been spotlighted in various texts and reports (Construction Industry Institute, Ogelsby 1989) as having productivity problems in that owners are not getting the required value from their construction expenditures. In addition, construction is a fragmented industry with the vast majority of firms of relatively modest size. Engineering News-Record (ENR) annually features "The Top 400 Contractors." To qualify for the Top 400 List, requires a minimum volume exceeding \$47 million (ENR 1995). However, in the United States, those construction organizations furnishing financial information to Dun & Bradstreet number over 500,000 firms (Adrian, 1993). For a manufacturing industry producing complex products that describes construction, it is hard to find parallels between construction and other manufacturers such as are found in autos, steel, chemicals, oil, and electronics. One of the current trends in various industrial segments is that of benchmarking which has been described as "the search for industry best practices that lead to superior performance" (Camp 1989). The construction industry is hampered by a fragmented nature and a lack of data concerning many core competencies. One partner in a "Big 8" accounting firm stated that of all the businesses that their firm deals with nationally, construction businesses were singularly unique in lack of key data on various business elements (Beadle 1992). One of the few areas in which publicly available data is available is the area of estimating. There are a number of organizations that publish estimating data on a national basis for the construction industry (Walker's, Means, Richardson, Saylor 1995). One drawback to these estimating publications is that they are averages. A more troubling aspect is when tabular estimating data between publications is compared with resultant wide discrepancies (Jelen, 1983). Given the fact that construction is highly competitive and most firms work in a local or narrow-scope regional area,

there is a reluctance to share best practices amongst contractors (McLaren 1992). Construction firms feel quite naturally that sharing best practices with competitors will simply make themselves less competitive. The question becomes one of how do construction firms improve their practices? Obviously, books, seminars, and other continuing education avenues are available for construction professionals. Often, these sources, in order to appeal to a more general construction audience, are themselves general in nature. The construction firm seeking to improve is confronted with a dilemma on where to go to find practices to emulate.

Constructor peer review can provide a solution to providing ideas for improved practices. Key personnel from other construction firms visit the subject construction firm and provide a thorough analysis of current practices and recommendations for improvement. To avoid the competitive problems enumerated above, peer review personnel are specifically selected from outside the construction organization's geographic market area. The benefits of this process accrue to both the firm studied as well as the peer reviewers themselves. This paper results from three consulting assignments by the author where the peer review process was developed and completed with a high degree of success (Opfer 1995).

Peer Review Fundamentals

Improving construction practice is essential for the long-term survival and profitability of the construction firm. It is not for every firm, only those that want to seriously improve themselves. Firms have in many cases spent significant sums improving minor items without significant results. Other firms have started improvement projects and floundered due to lack of guidance. Constructor peer review can help firms avoid these problems by finding the mission critical items to improve and how best to achieve this improvement.

However, effective peer review is not just about visiting construction firms. Otherwise, unorganized and unplanned peer reviews can end up just being "construction tourism" in which participants have fun and trade "war stories" but there is a lack of meaningful analysis along with resultant benefit (Hastings 1994). Part and parcel of the peer review process must include front-end planning, development of contractor data, peer review team selection, and peer review team report in addition to the site visit. Failure to provide adequate focus on all steps of the process can reduce the chances for success of the constructor peer review process. Breaking down barriers to open communication is another impediment to success in the process. In part, geographic diversity will help to foster open dialogue. Constructors need to be open in communicating their thoughts and work as a team to be successful. Unfortunately, many constructors are of the independent type and not used to teamwork but instead secrecy amongst competitors and an adversarial environment that clouds many construction projects. Part of the directive for open communications must be that peer reviewers do not ask for information on a firm's practices that they would not be willing to provide peer reviewers about their own firm on a subsequent peer visit.

Egotism amongst many in the construction industry is a key barrier to implementing constructor peer review. There are those that when certain improved ideas come along feel that this is fine but "my work is different" (Ogelsby 1972). The author has seen this attitude exhibited in many

instances over the past two decades of work in the construction industry. In 1974, interviewing two medium-sized contractors in the same market area about whether they utilized critical path method network techniques produced an interesting response. The highway contractor thought that "CPM was a good technique but was really suited for building construction projects" whereas the building construction contractor felt "CPM doesn't work on building jobs but is good for road projects" (Kuney, Degerstrom 1974). Some contractors already feel that they are utilizing the best practices since they have state-of-art software for estimating, scheduling, and cost accounting/control along with the latest field construction equipment. While this may be true, how software and other equipment is utilized along with the business practices that support it is what can be determined from constructor peer review. Peer review can also pinpoint the appropriateness of a given solution to the needs of the individual construction organization. Sales representatives selling computer software or construction equipment are interested in selling product and will push their available solution when a contractor need could be better satisfied by another route.

Peer Review Planning

The decision to implement peer review is followed by front-end planning. This planning should fit within the framework of the construction firm's overall strategic planning process. Specific target areas should be identified as those to be subjected to peer review. Top contractor management needs to be supportive of the peer review process as bottom-up methods are prone to failure. Part of the planning process includes identifying mission-critical core areas essential to the contractor's success. These mission-critical items usually include such areas as business development, cost estimating, purchasing, project management, equipment management, and subcontractor management. Deciding what is mission-critical and what is not should be driven by four tests:

The item should be difficult for the contractor's competition to emulate
The item should be a key factor in the contractor profitability
The item should be a key factor to clients in contractor differentiation and perceived value by the client
The item should be of a quantifiable nature or aspects of the item quantifiable if possible.

An item can be mission-critical for the contractor and not meet all four of the tests. The more an item fits the four test criteria means the more importance that should be placed on that item. This planning process is a difficult and unfamiliar ordeal for most contractors. As one observer stated, "most contractors spend more time planning the company Christmas Party than what they are planning to do in the next year" (Trease 1993). In tandem with the front-end planning, development of prospects for the peer review is necessary. Initial conversations with these prospects can help to focus the planning process. Part of the front-end planning should involve process modeling involving materials and information flow for the contractor. Who is the customer of the particular process? In the case of an estimate, this has both an internal and external focus. The external customer is the client receiving the estimate while the internal customers may be the purchasing agent who buys out material for the project along with field management who utilizes the estimate in cost control functions. A civil/structural contractor on

foundations has as an external customer the construction manager/general contractor they are contracted to and an internal customer in their own steel erection crew installing columns on the foundations and anchor bolt assemblies. Poor quality on foundation anchor bolt alignment causes subsequent cost problems in steel column erection. Inputs and outputs for these various processes can be analyzed during the planning process.

A cautionary note is in order in that the proper amount of time needs to be spent in planning for peer review. Trying to perform this front-end work in a week or a day will not suffice. The press of other work gets in the way and what can be postponed does get postponed "until tomorrow or next week." The person or team responsible for this planning should have familiarity with those areas under consideration. Since construction involves a mix of field and office processes, the person or team should have an appropriate experience mix. At the same time, the planning process should not be allowed to continue indefinitely. Schedules should be established with realistic milestones. The person or team should be given release time to accomplish their work in a quality fashion. Due to the hectic pace and understaffed nature of many construction organizations, several sessions spread over a number of Saturday mornings may be appropriate.

Peer Review Team Selection

Successful implementation of the peer review process depends on sound selection of team members. To ensure open communication and avoidance of competitive secrecy, these members should be selected from outside the contractor's geographic operations area. Constructors in their travels to other areas of the country should be looking for possible other constructors to participate in this process. Contacts through members of professional or trade associations such as American Institute of Constructors (AIC), Associated Builders & Contractors (ABC), or Associated General Contractors (AGC) can be very useful in developing possible names. An AIC, ABC, or AGC Chapter President, for example, may be able to put a contractor in contact with those in other geographic areas. Contacts at annual meetings and seminars of associations can be productive as well in establishing contacts. Construction services providers should not be neglected in this process. While the construction firm operates on perhaps only a local level, services providers such as accounting and surety bonding firms operate on a national basis. Conversations with a transplanted surety bonding agent or construction accountant new to an area may pinpoint possible progressive contractors in another market area for potential contacts. Disclosure of confidential client information should not be demanded but instead asking whether or not these contractors are successful should suffice for initial selection purposes.

Ethics in the constructor peer review process is an important criterion. If a team member has a potential conflict in that a relative in the contractor sponsor's locale works for a competitor, selection should be avoided in this instance. A potential team member may be planning to be employed by a competitor in the same locale that would provide disqualification grounds. All potential team members should be informed of ethical considerations.

Once constructor peer reviewer names are selected, initial contact can be via telephone. If subsequent upcoming personal contact at a convention or other meeting can be arranged, this can prove useful. Successful peer review selection should be a win-win process for all parties

involved and this needs to be clear at the outset of the selection contact process. Travel is expensive and the firm being peer reviewed should compensate the travel costs for the involved constructors. The time away from their work is also a consideration and can be compensated by an honorarium or hourly rate depending on the particular agreement. Upfront explanation of expenses and compensation can ensure that this is a serious effort on the part of the contractor sponsoring the peer review.

Besides compensation for the reviewers, other benefits need to be highlighted which accrue to them as a result of the review. Peer reviewers get to see the inner workings of other contractors and bring back new ideas to their own firms. Peer reviewers get a better perspective in that many firms have the same common types of problems. A peer review visit may help the peer reviewer avoid problems previously encountered by the contractor sponsor. A well-organized peer review can be continuing education for the involved constructors.

Constructors should be selected based on types of experience and firm types of work. A building contractor would want to ensure that a building contractor is represented on the team. However, contractors should not be too parochial in this selection process. An electrical contractor may have business practices that could provide sound examples to a general contractor. By aspiring only to be the best in its narrow area, "a team can set a cap on its own ambitions" (Hammer 1993). The other side of the coin is that before concrete commitments are made, resumes of potential peer reviewers should be evaluated by the contractor. A particular construction firm may be recommended as outstanding and deserve this reputation. However, a particular individual with that firm may have a relatively narrow and/or minor role with the firm. Constructors should be selected with a view toward overall experience. Thus resumes with further follow-up telephone interviews can help to avoid these situations. The aim is to recruit the best peer reviewers possible. The odds are that the perfect constructor reviewers cannot be found which leads to another concern. The selected team should be balanced in its composition. A four-member team with three estimators and one accountant would in all probability not possess the necessary balance. Selection of the number of team members will be dependent on areas identified in the front-end planning process for study.

The size of the selected team will usually consist of three to five reviewers. A smaller team usually will not have all the necessary areas of expertise. A larger team than five members can prove too unwieldy and unworkable. In part, team size can be governed by complexity of the contractor's operations. A general contractor self-performing a significant portion of their own work involved in several distinct types of work and including a design-build function is obviously more complex than a general contractor that self-performs no work and just builds strip shopping centers and small offices. The contractor sponsor should designate a team captain from amongst the constructors selected to perform the review. The team captain will be responsible for coordinating the observations and data gathered during the site visit into a peer review final report. At least two alternates should be selected for the team. If one peer reviewer becomes ill or is unable to attend due to family emergency, the alternate can be a substitute. As an adjunct to the team, the contractor sponsor should supply secretarial services to document the substance of conversations and discussion. Secretarial services avoid the distraction of team members for note taking and allow reviewers to focus on analysis and observation. As soon as possible, a transcript of the visit should be word processed and sent to the peer reviewers to assist

in analysis and compilation of the final report. Some contractors have the secretarial services on overtime to produce the current day's notes for immediate team member distribution the following morning.

Contractor Data Development

From both the planning process and team member interview, areas for data development can be determined for the peer review. Peer review is a comparative process where constructors compare their own firms with the contractor undergoing this evaluation. A comparative process demands data as a necessary input. Ideally, before the actual site visit, requested data and documents can be sent to team members prior to the review. In the accounting area, sample copies of sales journals, cost reports, payroll reports, and general ledger areas may be requested in necessary data development. Financial ratios such as current ratios, average collection period, and return on assets are other areas. Business development data needs include clients and type, firm image evaluation, expenditures on advertising and promotion, competitive analysis, and substance of direct sales efforts. Field management evaluation can include accuracy of work-in-progress schedules, materials procurement cycle times, equipment utilization, change order processing procedures, and safety records.

In data development, the six questions to be answered include who, what, when, why, where, and how. Data development is a costly but essential aspect of this peer review process. Ensure that a dollar isn't spent to gather a nickel's worth of data along with ensuring that necessary data is made available. The level of detail should be in summary form to avoid bogging down team members in minute details. Once problem areas are identified, further analysis can be performed by internal contractor personnel. Data gathering can be inhibited by poor communication by the contractor sponsor. The firm's internal personnel should be informed that data are being gathered for the peer review. The review is not being conducted with the agenda in mind to terminate anyone. Rumors can quickly spread given a lack of communication within the firm. Usually any redundancies found result in the redeployment of personnel to other necessary areas and not in the elimination of personnel. Someone who feels their position may be eliminated will be reluctant to fully cooperate in the peer review process. It should also be emphasized that people are not being examined but instead management practices.

During contractor data development, the firm may find areas for improvement even before enacting the peer review process. As data is gathered, the contractor should be analyzing four areas as to whether: existing reports are inflexible or ill-timed existing reports impede change existing reports serve some areas at expense of others existing reports are irrelevant.

Existing data collected may be too late in the process to be of use. A peer review may find that a cost report meets necessary criteria but the timing of the report is two weeks after field costs are incurred which can make its use in cost control efforts debatable. Or a particular construction process or project may demand a different type of cost report which can not be provided by the existing system which leads to non-optimal results. Some existing data in reports is too weighted towards cost at the expense of quality and client satisfaction that can impede the contractor's long-term change efforts. Data demands on field-level construction personnel are intense but all

information flows are bottom-up and little is top-down. Some data is compiled which no one in the firm may know why it is reported save for the fact that "it's always been done this way." Peer reviewers can force justification of these reports and should be supplied with copies of all reports with explanation and justifications for each report along with report timing. Various processes can be broken down in data development with flow charts delineating various areas where data comes from and where it goes for the contractor's operations. The end goal of data development, of course, must not be lost sight of which is that of process improvement.

Peer Review Site Visit

Scheduling of the site visit may want to avoid a period of heated activity for the construction firm. This may be during the late fall or winter months for most firms as operations in many areas of the country are on a reduced schedule. At the same time, a survey of operations should be realistic and not when the workload is atypical. Sometimes contractor practices can change depending on workload. Stress points and the impact of bad practices or practices not followed are often more prevalent with high activity levels. Peer review can be a catalyst in pinpointing these deficiencies. The above factors should be taken into consideration in scheduling an optimal time for the peer review.

The time allotted for the site visit should be sufficient to allow for both face-to-face exchange and discussion along with an adequate analysis/observation of targeted areas. The team can split up to allow focus on both field and office operations of the contractor based on their respective areas of expertise. At least two full days should be allowed for the constructor peer reviewers. Depending upon operational complexity and number of areas to be studied, additional review time may be necessary. The key driver in this process is that both peer reviewer and contractor personnel time is severely limited in amount. An organized process with reviewers pre-supplied necessary reports and data before the visit can improve the productivity of the encounter. Key people in the contractor's organization should be identified and scheduled on the agenda beforehand. A scheduler may only be needed for an hour or an equipment manager for two hours. Regardless, the time should be allocated on the peer review visit agenda. Since the contractor has to maintain continuing operations, contractor personnel should be scheduled efficiently.

A peer reviewer team room can be set up by the contractor to facilitate the process. Often this room ends up being the contractor's conference room. If room is not available, some contractors have utilized an unused office trailer cleaned up, brought in for the occasion and parked next to the main office. The team room should be taken seriously and not as an afterthought with a viewpoint towards providing convenience and productivity for the peer reviewers. Computers, printers, copiers, faxes, phones, and other office equipment should be provided as necessary. A split field/office team should be accommodated with additional secretarial services. The presence of note taking can inhibit dialogue in certain instances. Thus the peer reviewers may be supplied with outside-the-firm secretarial services. Again, confidentiality of information is of key concern to contractors. Thus some contractor sponsors have brought in these secretarial services also from outside the relevant geographic area. While this practice may seem unnecessarily costly,

given the total costs of the peer reviewers plus contractor's personnel time costs, the additional marginal cost for outside secretarial services is relatively minor.

Before the peer review team leaves the contractor's site, an exit conference should be conducted between the team members and contractor top management. This provides a final opportunity to ask questions and clarify any misunderstandings on the part of team members. One purpose of the exit conference is to ensure no surprises in the final peer review report. The final report will not have been completed (except in basic outline form) by the time of the exit conference but its substance and its recommendations in summary form are made available to the contractor sponsor. During the site visit, additional information may have been promised to the team by contractor personnel that is still lacking by exit conference time. Conference discussion can serve as a reminder of the needed data. The tentative schedule for final report production is also scheduled at this conference.

The contractor should initially send each selected member a planned agenda and trip itinerary. Additionally, hotel arrangements at one hotel for the peer review team should be made and paid for by the contractor sponsor. Hotel selection should have convenient access to the contractor's business and the single hotel allows additional peer review interaction during off hours. Once the team is on location, arrangements for expenses should be completed promptly.

Peer Review Report

The peer review report is submitted at an agreed-upon time after site visit completion. The team captain is responsible for the production and distribution of the report. The report should communicate the findings of the peer reviewers in sufficient detail for action steps by the contractor sponsor. The findings should be accompanied by recommended courses of action to improve its practices to achieve peer reviewer recommendations. If possible, additional cost implications of possible action steps should be highlighted for the contractor. The peer review report will typically recommend change in a number of areas of the contractor's operations.

Sound peer review reports avoid generalities and focus on specific concrete action steps. Areas for improvement in the report consist of targets. However, not all goals are quantifiable; some may be qualitative in nature. Qualitative goals by their very nature present measurement problems. Insistence that everything the contractor does be by the numbers with quantitative targets is unrealistic. Similarly, the impact of uncontrollable factors must be taken into account. Targets for a residential builder/developer on a 200 unit subdivision with build-out 20 homes at a time will be impacted by external factors such as the local economy and interest rate levels. This will have a significant impact on whether certain targets may be met for the subdivision operations. If possible, the peer review report should have realistic timetables attached to the targets. Some targets may have a timeframe of one month for accomplishment whereas others may take six months to a year depending on the magnitude of the item.

The contractor may want to have two reports. The primary or main report covers all detail on an in-depth basis for internal consumption only. An executive summary of the main report may be produced in summary form for the reasons listed below: attachment to business plans when

seeking bank loans provided to surety bond underwriters for bonding evaluations included in client packet as part of business development/marketing efforts.

Naturally, there needs to be judgment and discretion utilized in making the plan or parts of the plan available to a wider audience than those internal to the firm. Whether, distribution of the report in an executive summary is done depends in large part on what is contained in the report.

Other Peer Review Advantages

Besides improving construction practice, there are other benefits to the contractor undertaking peer review. Some of these additional advantages may be just as important as improving construction practice.

Contractors in marketing their services to clients are continually looking for ways to differentiate themselves from the competing crowd of contractors. The fact that the contractor is making efforts to improve their delivery of construction services through the peer review process should be made known to existing and potential clients. Stories in the popular press abound on disreputable practices of some contractors. Constructor peer review highlights that this contractor is serious about improvement and not just looking for the "fast buck."

Financial institutions and surety bonding firms look for professionalism in a contractor's operations before granting credit lines and bonding lines respectively. The peer review can pinpoint improved practices but, in addition, the fact that the contractor is seeking improvement makes a positive impression on these firms. Complete copies of the report may be provided to the contractor's accounting firm additionally for their assistance and subsequent evaluation of the contractor.

Avoidance of litigation is a continual concern for those in construction. The contractor in its use of various contracts and other documents may be open to lawsuits because of weaknesses inherent in certain documents. The contractor that states "this document has been used by us for twenty years with no problems" may not realize their potential legal liability until the item is scrutinized during peer review (Harrison 1994). In providing certain services that result in a lawsuit, the contractor is held to the "reasonable standard of care" rule. Courts do not expect contractors to walk on water but to exercise a reasonable standard of care in their operations. Successful peer review can provide additional evidence that the contractor is adhering to a reasonable standard of care in their work.

Peer Review Report Implementation

While the mere fact that the contractor has undergone evaluation is a positive factor in and of itself, implementation of the peer review report recommendations is essential. There may be problems with this. The vast majorities of contractors are family or closely held businesses (Morris 1992). One problem with the family or closely held contractor is that of a certain amount of personal pride and emotional investment in various practices. A practice started by the

contractor's founder, now outdated, may still be in use because "that's the way we've always done it." Report implementation must recognize these barriers and start gradually. Perhaps small modifications in certain areas or pilot projects are all that is initially possible.

Successful report implementation will depend on the buy-in of all participants in the particular operation. Top management support is obvious but achieving the support of all those impacted by the required changes in the contractor's continuing operations is ignored sometimes. Due to the interdependent nature of many construction operations, coordination problems should have input by those directly involved subordinates. One of the important principles of the TQM movement is seeking involvement in decisions for those directly affected (Jacobson 1986). Some of the report recommendations may require a coherent package of changes rather than independent solutions to particular problems. To ignore this need for coherence in certain areas can ensure a non-optimal result in many instances. Tracking of progress towards peer review recommendation should proceed on a regular basis.

Implementing practice recommendations means investing time, money, and other resources. All of these are limited. Therefore, focus needs to be on those areas that promise the highest return to the contractor, given that the above caveats on interdependence and coherence are recognized. The changes to be successful usually require a certain package of minimum resource levels and not "what the budget will allow" for the contractor. The mistake that contractors can make in report implementation is in throwing too few dollars at too many projects. To be effective, choices have to often be made by the contractor.

Summary

Contractors face highly competitive construction markets in the current environment. Gaining a competitive edge over rival contractors is a continual challenge made more difficult by the secrecy, lack of data, and fragmented nature of the construction industry. Constructor peer review utilizing resources from outside the contractor's competitive geographic arena can provide solutions for improving construction practice. Besides the primary goal of improving construction practice, other benefits in marketing, legal, financial, and surety bonding areas can accrue to the contractor. Peer review provides the additional benefit of highlighting certain areas for improvement that the contractor previously may not have recognized as improvement candidates. To be successful requires a substantial commitment by the contractor not only for the peer review visit but for planning, data development, reviewer selection, and report implementation. Peer review should focus on the concept of construction systems which takes a broad perspective. An important point about those components of the construction system is that they are all integrated; trying to make a change in one dimension will change the others.

The constructor peer review process is not a "magic bullet" that will help a contractor with all problems. Problem identification is dependent on the quality of the reviewers and their efforts. Solution implementation coincides with the ability of the contractor to make the required changes given resource limitations and other constraints. Certain macro environmental problems for contractors such as taxation, regulatory agency impact, declining markets, and growth restrictions are beyond the scope of peer review.

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