CONSTRUCTION COST FACTORS IN NIGERIA[a]

Closure by A. Uchechukwu Elinwa[4] and Silas A. Buba

We welcome John H. Nebiker's remarks and his recognition of the importance and implications of cost factors in the construction industries.

It is the writers' view that the postconstruction period, which is the maintenance period for the contractor within some specified period, remains independent of cost incurred during the construction period. The contract agreement retains part of the contractor's payment for such a period until the expiration of the time. Therefore, the writers find it difficult to agree to the fact that subsequent repairs carried out during the maintenance period will dwarf the overruns in direct construction costs.

The discusser's remarks on sources of finance are well noted, and the writers are in agreement with his view on this subject.

He has also discussed in detail the issues of funding and bidding by virtue of his involvement with the World Bank. We appreciate all his comments and hope that they will trigger more research into the issues of contract funding and the attendant problems. This will make a good reference for Nigeria and many of the industrial nations.

CHOOSING APPROPRIATE CONSTRUCTION CONTRACTING METHOD[a]

Discussion by Joseph P. Connolly,[2] Member, ASCE

The author has provided an excellent decision-process review and quantification for an important area in construction that has long been ignored. The author is correct in the premise that the construction industry operates in traditional methods. These actions differ within the public and private sectors, and within the various industries in the private sector.

The discusser has a background in major oil and gas as well as petrochemical construction, both domestic and international. From that experience, the discusser would like to present the following points for consideration.

SCOPE

The author suggests that the construction-contract scope is a by-product of the organization selection. This has not been the discusser's experience. In the aforementioned private sectors, the scope generally determines the organization. The project contracting (and construction contracting) scope is developed at the project-proposal stage as a project-contracting strategy. The project-contracting–strategy development model typically utilizes the "project drivers" as defined by the author in establishing the scope for the project. Within this model, the organization selection then follows the author's model, but the impact of owner drivers are usually ignored (owners tend to see themselves as experts). The result is that the decision on scope drives the decision on "organization."

PROCUREMENT NEEDS

One of the major factors in construction-contracting–strategy development for oil and gas as well as petrochemical projects is the procurement of plant operating equipment, around 50% of the total project cost. Who buys, when, and how has a direct impact on construction-contract scope and organization because it directly impacts risk. For an industry-specific model, this could fit into the project drivers somewhat, as does "preconstruction service needs."

RISK

The author defines construction-contract risk as financial risk—the risk of what the final cost will be. The author's analysis of risk could be expanded to include what the discusser would term political risks—i.e., risks associated within the working environment rather than the work itself. As with project-construction risks, these also can be written into the contract (with financial impact). It has been the discusser's experience that decisions on allocation of this type of risk frequently make a 5–8% difference in the construction-contract cost. The conflict between contractor and owner arises in the same manner as outlined by the author. Again, as the author points out, some of the forms of organizations are more applicable for this type of risk allocation than are others.

FUTURE APPLICATIONS

The author has developed a good basic outline of the construction-contracting process that should be expanded to become a project-contracting–process quantification. The discusser trusts such expansion is either under way or has already been completed. When published, it should be immediately useful to an industry that is constantly seeking a structured format as the basis for its decision process.

THE CONTRACTOR-SUBCONTRACTOR RELATIONSHIP: THE SUBCONTRACTOR'S VIEW[a]

Discussion by Robert F. Borg,[3] Fellow, ASCE

The authors' technique of exploring various problems and research projects in the construction industry by means of questionnaires serves them well, perhaps the best that they have ever done, with this paper. Professor Hinze understands

[a]December, 1993, Vol. 119, No. 4, by A. Uchechukwu Elinwa and Silas A. Buba; Discussions in March, 1995, Vol. 121, No. 1 (Paper 4199).

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[a]March, 1994, Vol. 120, No. 1, by Christopher M. Gordon (Paper 4257).

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[a]June, 1994, Vol. 120, No. 2, by Jimmie Hinze and Andrew Tracey (Paper 5554).

[3]P.E., Chair., Kreisler Borg Florman General Constr. Co., Scarsdale, NY 10583.

the construction industry very well, as evidenced by his previous writings and his recent book, *Construction Contracts*. With very able assistance from Mr. Tracey, he has brought to our attention many thought-provoking matters that heretofore have never been examined.

Although the sample of 28 subcontracting firms used would be more beneficial as a much greater number, we can nevertheless discern some trends that will form the basis for further research and investigation.

As far as the results are concerned, the following comments by a practitioner in the general contracting and construction management business for almost 50 years may serve to be of some interest.

In the "Results" section of the paper is a discussion of "bid shopping." Various reasons for bid shopping are given, and certainly this particular practice is going to be very difficult, if not impossible, to ever eliminate from our industry. This is a by-product of what we call, very simply, "free enterprise." We are fortunate that we are able to operate under this system. Whether bid shopping takes place before the bid or after the bid opening, we must all ask ourselves whether it will ever be possible to have a construction-contracting industry in any section of the country, any city, or any town that will not be fiercely competitive. If the answer is no, then it follows that competitors will have to strive for the best prices they possibly can attain within legal bounds.

When we think of bid shopping, we must also consider the position of the subcontractors themselves vis-à-vis this particular practice. Is there a subcontractor who is able to admit to us that he or she does not attempt to get lower prices for materials, insurance, equipment, and other components of his or her costs? And what of a subcontractor who attains a particular advantage in bidding, such as "tieing in" with every one of the general contractors. With this ploy, no matter who gets the job, the subcontractor gets it.

We have a tendency today for more and more owners to call contractors in, whether low bidders, second bidders, or even third bidders, and discuss with them ways of saving money. Under present day tight construction-cost restraints, all is fair in purchasing all the way up and down the line, whether its from the owner, contractor, or subcontractors. In an effort to attain the best prices possible and analyze bids and proposals, we must all cooperate to see whether indeed they can be changed for the benefit of all parties by either value engineering, shifting some of the risks from one party to another, or simply having the competition meet those who are willing to work for less (within reason).

This brings to mind another very essential ingredient in today's construction cost and shopping situation. That is the position of minority- and women-owned business enterprises. Here many of us are under very specific requirements about expanding our awards to such entities. These awards are not always made on the basis of a low bid or cheapest cost for procurement. And well this might be. You can hardly expect that the objectives of affirmative action can be met in the rough and tumble bruising wars of general contracting, subcontracting, and owners procurement without some concessions.

Of course, we must also think in terms of not just minority- and women-owned business enterprises. There doesn't seem to be any real purpose served for giving favorable awards to just the same few such enterprises if they are not operating at a disadvantage in comparison to others in the industry. After all, isn't that what started the whole thing? The general contractor must therefore be constantly searching for new deprived and start-up firms, and must lend a helping hand to such enterprises. One example of this is the Mentor Program of the New York City School Construction Authority (NYCSCA). As manager for the entire Borough of Queens, New York City, for the NYCSCA Mentor Program, we are helping literally hundreds of minority- and women-owned businesses in both contracting and design to not only receive design or construction contracts, but also to execute and perform these jobs.

While on the subject of racial or gender effects in the contracting and subcontracting industry, it should be mentioned that there are also religious and ethnic lines that form the basis of a good deal of the business practices used by the construction industry. We must all recognize that contractors, subcontractors, and owners like to do business with their friends. And well they might. Should we be expected to give our work to strangers? Friends often include principals in firms that are of the same ethnic, religious, educational, geographic, and even military backgrounds. It's very difficult to argue against this concept, yet it does account for an inability of certain firms to bid for and be awarded certain work.

Bidding practices of subcontractors could hardly surprise anybody who is active in the construction industry. One interesting aspect of this analysis, as shown in Table 2 of the paper, is the increasing use of faxes for the submission of bids. As pointed out, a substantial number of subcontractors submit their bids by fax very close to bid time. The ultimate is not too long in coming. We will see the day, on the morning of a highly publicized and sought-after public-works job, when 300 subcontractors and suppliers will fax their bids to each general contractor in the space of five minutes. Of course, this is a fanciful thought, but it may not be far from the truth. Is electronic technology ready for this advance? Doesn't it seem as if some enterprising computer hacker has fertile room for a new development in the electronic information highway? Imagine the money that could be made by someone who can devise a system for accomplishing just what has been described. A fortune lies in wait for some yet unknown computer genius.

The question of subcontract agreements is very neatly outlined by the authors. While AGC Document No. 600 attempts to be evenhanded to both the general contractor and subcontractor, there can be no question that it betrays its authorship.

As far as AIA Document A401 is concerned, Mr. General Contractor, forget it! The latest edition of this document reads as if it was prepared in the backroom of a subcontractors' trade association office. It abounds in absurdities, such as requiring the general contractor to hold the subcontractor harmless, paying the subcontractor interest on payments due even though the general contractor may not have received payment (through no fault of the general contractor), and other fantasies that the subcontractors would like to dream about happening. Of course, these cannot exist in the real world. What would be fair practice for the entire industry to observe? Try to find a copy of one of the earlier editions of the AIA form of Contract between Contractor and Subcontractor, such as the January 1972 edition. It is benign enough to use in any situation. The general contractor can then expand on it by means of a rider to include any of the tough or lenient clauses the situation may require. A sample of such a construction rider is Fig. 17.7 of the section on Construction Management coauthored by the discussor in the 1994 edition and earlier editions of the McGraw-Hill Building Design and Construction Handbook. To this should be added the standard form of arbitration clause.

Insofar as the general contractor binding the subcontractor to the terms and conditions of the main contract for the portion of the work being let to the subcontractor, what would

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the authors substitute? Can we envision the chaos if each general contractor begins to reapportion the scopes that have been set forth by the owner in his or her contract? There is no other way.

Regarding subcontract administration practices (as set forth in Table 4), this appears to be an outline of reasons for introducing partnering on jobs. Most of the chaos present in such matters as safety, representation of subcontractors interests, review of shop drawings, change orders, and work being traded between subcontractors and general contractors mentioned by the authors is a fit and logical subject for being part of the partnering process. The American Arbitration Association, in its newly issued booklet, "Construction Industry Dispute Avoidance—The Partnering Process," is ready to come to our assistance. The discussor, who was involved in the drafting of this document as the ASCE representative on the National Construction Dispute Resolution Board of the American Arbitration Association, feels that eventually partnering—and its handmaiden, dispute review boards—will soon be the norm in the construction industry. The pamphlet entitled, "Construction Industry Dispute Review Board Procedures," recently issued by the American Arbitration Association, will explain this concept.

These pamphlets are available, free of charge, as is the standard arbitration clause, by writing to the American Arbitration Association (AAA), 140 West 51st Street, New York City, NY 10020. Incidently, for those members of the industry who are not arbitrators and have not yet availed themselves of the privilege of becoming one, I recommend that they ask the AAA about the formalities of becoming an arbitrator. Those who desire to do so will receive free arbitrator training and become a valuable credit to their profession.

The question of retainages and final payments leaves the general contractor as weak in the knees as it does subcontractors, maybe even weaker. Closing out jobs is not always to an owner's advantage. Real and fancied reasons for delaying closing jobs may be part of an owner's customary practices. No one is in a hurry to pay money when it can be delayed. Persistence is needed here.

The authors' closing recommendation—that the major imperative of the industry is to strive to establish working relationships through the most ethical means—says it all. The integrity and public image of the industry, as the authors point out, will inure to all of our benefits. This paper will serve to provide many guidelines for the industry to police itself in this regard.

Congratulations are owed to Hinze and Tracey for having opened and brought to the arena of discussion so many of the valuable ideas that they describe.

Discussion by C. E. Haltenhoff,[4] Fellow, ASCE

The authors have surfaced a topic that civil engineers in design and construction have failed to show adequate interest in for much too long: the construction and contracting relationships and practices that prevail between general contractors and trade contractors when using the general contracting project-delivery system.

They have uncovered the tip of a very large and cantankerous iceberg, one which needs a lot of attention. Hopefully they have opened Pandora's box and many civil engineers in design and construction will renew their professional obligation to construction users by taking time to question and comment on the contracting system they often advocate without question.

Unfortunately, the exploratory nature of the authors' effort couldn't reveal the gravity or seriousness of the inherent problems that prevail. Therefore, the urgency for accurate understanding, profound discussion, and proactive resolution of the relationships and practices could not be established.

General contractor–subcontractor relationships and practices are much more volatile and contentious than the author's exploratory study reveals. Many prevail by precedent, at the "totalitarian" insistence of general contractors and "subjacent" objection of subcontractors.

Subcontractors are actively and persistently seeking relief, through negotiations with general contractors and legislation, from prebid and postbid shopping, pass-through progress payment arrangements, and exculpatory subcontract language.

Most important of all, under only cursory analysis, some of the accepted relationships and practices are a detriment to construction users; they are uneconomical, inefficient, and antiquated in today's construction marketplace.

Ten years ago, a mail survey (Ahlborn 1986) of 1,219 subcontractors was initiated, with 270 returns and 251 valid responses. The Likert scale and SPSSX analysis software was used. The z scores were calculated to establish the statistical significance of each Likert-scale question.

The results of the survey were tabulated, compared, and summarized; they clearly challenge the credibility of general contracting "accepted practices." The section called "Desires of the Trade Contractor" (Ahlborn 1986) concludes as follows. The words in brackets have been inserted by the discusser.

> Trade work in the construction industry has become increasingly specialized as new technologies affecting construction methods, materials and management techniques are incorporated into today's projects. The functional role of the trade contractor has advanced to a new level of industry involvement, however traditional practice dictates that they [subcontractors] operate exclusively as subcontractors to general contractors. Trade contractors have expressed their dissatisfaction with many practices common in the general contracting system.
>
> The trade contractor desires a more equitable method of progress payment distribution, such as receiving them directly from the owner. General contractors use progress payment distribution as a means of leverage to improve subcontract performance, however, subcontractors indicate that delays in receiving earned progress payments have a negative effect on their performance on a project.
>
> Trade contractors favor the elimination of bid shopping, a common practice considered by many as unethical. They desire to bid a project once, on a defined workscope, with no opportunity to adjust the price after bid submittal. Given this opportunity, trade contractors would submit their best competitive price the first time.
>
> Trade contractors desire a more thorough explanation of the scope of work to be performed. This explanation would be in the form of a well defined, written work scope, with prebid meetings held to clarify bidding requirements.
>
> Trade contractors desire to submit their claims directly to owners instead of through general contractors. They feel they are not treated fairly in cost negotiations relating to claims, changes and extras.

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Trade contractors desire that increased attention be paid to quality control efforts, as this would assist in the prevention of extensive rework and also reduce the punch list work necessary to complete a project. Trade contractors also desire better coordination of the trades to help alleviate interface problems and prevent scheduling conflicts.

The section entitled "Effects on the Owner" (Ahlborn 1986) concludes as follows.

Owners can benefit from a system [of contracting] that allows for the inclusion of the desires of the trade contractors as expressed herein. All of the concerns addressed relate directly to the subcontractors cost of doing business, which is ultimately passed on to the owner in the form of higher bid prices submitted to general contractors and in the degree of quality provided in the constructed project.

Delays in receiving delayed progress payments cost the subcontractor money. They have expressed the willingness to submit lower bid prices if they could be assured of timely payments.

Bid shopping causes bids to be inflated to compensate for its effect. Trade contractors are selective in who they submit bids to and they do not submit their same price to all general contractors. Therefore, general contractors are never assured of receiving every low subcontract proposal, and thus, proposals submitted to the owner are never as low as they could be.

A well defined, written workscope and prebid meetings to clarify bidding requirements would enable trade contractors to submit more accurate proposals. This would reduce contingency amounts added to their proposals and could therefore save money for the owner.

Owners would be better off by directly administering trade contractor cost negotiations related to claims, changes and extras. This would eliminate any pass through costs added by general contractors.

Increased attention to quality control would result in a better prject for the owner. Proper coordination efforts facilitating effectively run projects would allow trade contractors to plan their work more efficiently and could reduce their performance costs.

The authors' exploratory study indicates that Ahlborn's findings regarding general contractor–subcontractor relationships still prevail. However, the authors have missed the heart of the situation; the fact that existing relationships and practices used in the general contracting system are not the best the construction industry has to offer to its users.

An example of where we are can be found in the contracting and construction of a building using the general contracting system of contracting.

General contractors typically subcontract between 80% and 100% of the work to trade contractors, so it can be said that trade contractors construct buildings and general contractors are essentially the managers of the project. It seems logical that owners should select and have control of those who construct and prudently choose who should manage; both very important keys to a project's ultimate success.

However, when using the general contracting system, owners allow the general contractors to qualify, select, and control the trade contractors and then choose the general contractor to manage the project on the contractor's ability to submit a low bid, rather than on a demonstrated ability to manage the project. Owners and design professionals remain at arm's length in the selection of trade contractors, and gullibly assume all general contractors are competent managers.

The discusser sincerely hopes civil engineers in design and construction will objectively rekindle their professional obligation to provide owners with the best possible results from the contracting process they administer.

The trade contractor's problems have gone without notice for too long, even though they are clear indications of an unhealthy contracting environment and testify to the fact that the general contracting process does not automatically function in the best interest of the construction user.

Gaining an accurate understanding of the general contractor–subcontractor relationships and practices through additional study and broader discussion will certainly be a major step in the right direction.

APPENDIX. REFERENCE

Ahlborn, M. F. (1986). "An evaluation of trade contractor attitudes toward construction industry practices," MSCE thesis, Michigan Tech. Univ., Houghton, Mich.

Closure by Jimmie Hinze[5] and Andrew Tracey[6]

The writers appreciate the numerous comments made in the two discussions. Because one discussion essentially stated that the general contractor–subcontractor relationship is worse than indicated in our study and the other stated that a better alternative may not exist, we will provide comments that focus on the two different points of view.

It should be emphasized that our study was exploratory in nature. The intent was to describe the general contractor–subcontractor relationship. Although possible problem areas were identified, the objective of the study did not include attempts to rectify those problems. If further work is warranted, it was hoped that this study would provide that initial base of information on which changes might be made.

Haltenhoff states that the general contractor–subcontractor "relationships and practices are much more volatile and contentious than the author's exploratory study reveals." Unfortunately, he fails to elaborate on that point. Although prompt payment legislation was supported vigorously by subcontractors, this has only resulted in changes that impact work performed on federal projects.

It is further stated that the general contractors typically subcontract at least 80% of the work and that general contractors tend to be managers of construction. Of course, this is the very reason that the general contract approach came into being. Haltenhoff recognizes that payments from the owner made directly to subcontractors would alleviate some problems of cash flow for subcontractors, but that general contractors would argue this removes necessary leverage for dealing with subcontractors.

Many would agree with Haltenhoff that the general contract method is not the best delivery system in the industry. Perhaps this is exemplified by the increased use of the design-build approach, the broad acceptance of the construction management approach, and the sweeping acceptance of partnering in recent years. On many public projects it may appear unrealistic to expect to eliminate the general contract approach. If an owner decides to try a different approach for contracting, care must be taken to insure that selection cri-

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teria include the quality of managerial services to be gained. If price is the primary factor, the evils of bid shopping are likely to reappear, albeit in a slightly different form.

Haltenhoff states, "Trade contractors favor the elimination of bid shopping." We would argue that this is perhaps true for many subcontractors, but not for all. In fact, where prebid bid shopping is concerned, it is typically a subcontractor that initiates the practice. Such a subcontractor simply needs to find a general contractor who is willing to share information about the bid amounts submitted by other subcontractors in the specialty area. In that scenario, we find both parties to be unethical in their practices.

The issue of scope definition is raised and is a most appropriate one. Haltenhoff suggests that prebid meetings be held to clarify the scope of work to be performed for each subcontracted item of work. This is an excellent suggestion. Perhaps such meetings would occur more frequently if the general contractors had greater assurances of receiving the contract award. Such meetings would be time-consuming. If a general contractor must submit an average of eight bids for each contract that is awarded, it is clear that the return on such prebid meetings may not be warranted. Nonetheless, the suggestion should be given more consideration.

It is suggested that subcontractors have the desire to submit claims directly to the owners. This is another issue in which the general contractor might feel that the ability to manage is compromised if the subcontractor has more direct access to the owner. Our concern would be that the general contractor's accountability to the owner might be seriously compromised if the subcontractor deals directly with the owner. Would the owner then bear the burden if a subcontractor went into default? This may not be in the best interest of the owner.

The issue of "pay when paid" is a standard one in the industry. For subcontractors, the sentiment is virtually unanimous that the practice is unfair. This is an area in which general contractors do have some control. It is one matter for the general contractor to pay the subcontractor immediately after receiving payment from the owner, and it is quite a different matter for the general contractor to withhold the payment for several weeks after the payment is received. The payments that have been earned by the subcontractors should not be used as investment opportunities.

Haltenhoff cites the findings of Ahlborn in a study performed "ten years ago." An examination of those findings shows that the subcontracting arena has not changed appreciably in the past decade. Many of those previous findings are quite consistent with those disclosed in our study.

Borg provides several insightful points from a general contractor's point of view. His comments lend good balance to those of Haltenhoff. He points out clearly why the bid-shopping practices surface in the construction free-enterprise system. He also points out that general contractors are not the only parties guilty of bid shopping. He states that some subcontractors probably treat some of their sub-subcontractors in the same manner. Although he also extends this to the practice of getting lower prices on materials, insurance, equipment, and other components, we do not regard all of these practices to be the same as bid shopping.

The central conclusion we came to was that the practice of bid shopping still occurs in the construction industry. We were not proposing any alternative means of eliminating this practice. We recognize it as being unethical whether bid shopping is initiated by subcontractors in the prebid period or by the general contractors during the postbid period. The study did not disclose the extent to which the practice occurs. The fact that one party is known to practice bid shopping makes it no less an unethical action for others to follow suit.

Perhaps bid shopping is not universally defined. This may stem from the differing attitudes that exist about the definition of what constitutes ethical or unethical practice. It is not unethical, in our view, for two individuals to agree to work together on a project. What is unethical is if others are falsely led to believe that their bids will be given serious consideration and will result in a subcontract agreement for the firm that submits the low bid.

The issue of "tying in" was mentioned as a means by which other firms were not permitted to have their bids given serious consideration. We do not regard the practice of tying in as being inherently unethical. An example of tying in would be an arrangement whereby a general contractor and an electrical contractor agreed to become parties to a subcontract agreement in the event the general contractor was awarded the contract. If the general contractor was then awarded the contract and the electrical work was then subbed to the electrical contractor, the tying in would be complete. Unethical practices could creep in if the general contractor solicited bids from other electrical contractors with the explicit intent of using these other bids to keep the tied-in contractor honest. This would imply that the other bidders, from the very beginning, had no realistic opportunity to work with the general contractor.

Borg predicts a dilemma with the use of fax machines. He said he could almost foresee the day when "300 subcontractors and suppliers will fax their bids to each general contractor in the space of five minutes." Actually, similar nightmares have already occurred. For example, one large Northwest contractor decided to bid on a major project in the San Francisco area. A team of estimators went to San Francisco to set up a temporary office in order to solicit price quotations from suppliers and to receive bids from subcontractors. The temporary office included a fax machine. On the bid day, the bids started to come in at an incredible rate and in unanticipated numbers. The memory of the fax machine was fully utilized and further faxes could not be received. The estimating team was totally frustrated in its efforts. One team member stated that three fax machines would have been needed to handle the information. The team returned to the Northwest having failed to assemble its bid on time. This was a costly lesson. Although Borg called his prediction "fanciful," it was all too much on the mark for this one contractor. We are hesitant to even speculate that a devious general contractor might someday devise a scheme whereby copious worthless information is faxed to a competitor with the specific intent of clogging the fax machine.

It was mentioned that it is customary for subcontractors to be bound by the terms of the contract between the general contractor and the owner. This is as it should be. What is also important is for the subcontractors to be fully apprised of the contents of such agreements. Each subcontractor should be given a copy of the general conditions of the contract. We were suggesting nothing else.

When subcontractors submit their bids to the general contractors, they typically do so without the benefit of seeing the actual subcontract agreement to which they will be signatories. Despite this, in almost all cases they will be forced to honor their bids. Under the principle of estoppel, the subcontractors are rarely permitted to claim mistake or error as a means of avoiding entry into an agreement. Of course, subcontractors need not fear every subcontract agreement, and they should be mindful of the fact that significant differences exist between some subcontract agreements. If provisions are unduly harsh in shifting risk to the subcontractor, the subcontractor who does not want to bear such risk may very well decide to modify the wording of the risky clauses to make them more palatable. If the subcontract is then awarded

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to a different subcontractor because of the modifications, there is no recourse available to the general contractor against the subcontractor who modified the subcontract agreement. Naturally, it would probably be a different scenario if the subcontractor was permitted to preview the subcontract agreement prior to submitting the bid.

Although it was not a part of the original study, the writers have collected copies of various subcontract agreements in use in the Puget Sound area. The standard form agreements used in industry tend to be the "most fair," but it is the tailored agreements that seem to carry the greatest risk. A sampling of some of these subcontract provisions that should be given serious consideration prior to signing are as follows:

> Contractor shall have the right to utilize the Subcontractor's facilities, equipment or scaffolding at no additional cost thereto.
>
> If details are ambiguous then a workable solution will be arranged with the necessary trades and the Contractor at no extra cost to the Contractor with all costs allocated to the Subcontractors as determined by the Contractor.
>
> The Subcontractor agrees to start work immediately when notified by the Contractor.
>
> If the Contractor directs the Subcontractor to work overtime, it is understood that the Contractor is to pay only the actual cost over the rate for regular time for said overtime.
>
> It is expressly understood that in the event the Contractor shall at any time be of the opinion that the Subcontractor is not proceeding with diligence and in such a manner as to satisfactorily complete said work within the required time, the Contractor shall have the right, after providing reasonable notice, to take over said work and complete the same at the cost and expense of the Subcontractor.
>
> Payments will be made to the Subcontractor when such funds have been paid to the Contractor by the Owner. To receive payment, the Subcontractor shall complete the partial lien release section of the application for payment prior to submitting the application to the Contractor.
>
> Progress payments shall be considered as advances and are subject to adjustment at any time to allow for errors and overpayment. If the Contractor deems the unpaid balance insufficient to ensure completion of the work, further payment to the Subcontractor may be denied until final completion.
>
> The Subcontractor shall keep the building and premises reasonably clean of debris resulting from the Subcontractor's work. If the Subcontractor fails to comply, within 4 hours after receipt of notice of noncompliance from the Contractor, the Contractor may perform such cleanup and deduct the cost from any amounts due to the subcontractor.
>
> Whenever it is deemed useful to do so, Contractor may occupy and/or use any portion of the work which has been either partially or fully completed by the Subcontractor before final inspection and acceptance thereof by the Owner, but such use shall not relieve the Subcontractor of his guarantee of said work nor of his obligation to make good at his own expense any defect in materials and/or workmanship which may occur prior to final acceptance.
>
> The Subcontractor shall protect, indemnify, and save the Contractor harmless from and against any damage, cost or liability for injury or death to persons or to damage or destruction of property arising out of the work performed under this Subcontract.
>
> Subcontractor specifically waives immunity that may be granted it under the Workers' Compensation Act.
>
> No claims for additional compensation for delays, whether in the furnishing of materials by the Contractor or delays by other Subcontractors or the Owner, will be allowed by the Contractor unless they are specifically agreed upon at the time such delays occur and such additional compensation is granted by the Owner with the necessary extension of time.
>
> In the event of any failure of Subcontractor to complete his work within the required time, the Subcontractor agrees to reimburse the Contractor for any and all liquidated damages and, whether or not liquidated damages are so assessed, Subcontractor agrees to pay additional damages as the Contractor may sustain by reason of any such delay.

Although there are varying degrees of risk assoicated with the quoted provisions, subcontractors need not feel compelled to become a party to a subcontract agreement that bears unwanted or unrealistic risks. Provisions with risk will not be identified if the subcontract agreement is not read prior to signing it. It is therefore incumbent on the subcontractor to read all provisions. It is not uncommon for subcontractors to recognize provisions that harbor unwanted risk and then have them strike that provision.

One general contractor was asked if his company's standard subcontract agreement harbored such risks for the subcontractors. He began to laugh and openly admitted that some provisions might be "a bit harsh." Then the general contractor was asked what his response would be if a subcontractor would strike some of the harsher provisions. At that point he became more serious in his tone and remarked that that was precisely the type of subcontractor that he wanted on his job. He did not object to having certain clauses struck from the agreement and was delighted when this was done because it would assure him that the subcontractor had read the agreement.

We appreciate the depth of thought provided in the two discussions. We too feel that the topic of the general contractor–subcontractor relationship warrants considerable study. Well over 50% of our construction put in place is through the efforts of subcontractors, and on building projects it is more typically about 80% or 90%. Despite this, we know so little about this facet of the industry. Hopefully others will see this as a viable research area and publicize their results.

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