A Primer on Industrial Design-Build Construction Contracts

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Although a great deal of material has been published on construction contracts, very little of it focuses on heavy industrial and process construction. Most of the legal commentary and standard form documents published by the professional societies are geared toward residential and commercial construction, which is usually driven more by architecture than engineering. The purpose of this article is to acquaint the unfamiliar lawyer with the unique and unusual issues and aspects of industrial design-build construction contracts so that the practitioner can understand, review and prepare them with greater confidence.

Introduction

The design-build relationship.

Many (possibly most) process/industrial construction projects are let on a design-build basis. Design-build construction is increasingly popular in commercial projects as well.

Design-build construction merely means that a single entity is responsible for both design and construction of the project. The design-builder may be a single company, or it may be a joint venture. The design-builder need not have in-house capability to perform both construction and design; a construction contractor may subcontract the design work, or an engineering firm may subcontract the construction work.

Some design-build contracts are "turnkey" contracts. In a turnkey relationship, the design-builder not only designs and constructs the factory, processing plant or similar facility, it also ensures that the plant is functioning and ready to operate for the owner. The term "turnkey" derives from the concept that the owner may figuratively insert a key into a slot and turn it to begin successful operation of the plant.

There are some important differences between the relationship of a design-builder to an owner and the relationships of a separate designer and contractor to an owner. One difference is that the design-builder warrants all of its work, including the design. In an ordinary "plan and spec" job, the contractor warrants its work, but the design professional makes no implied warranties and is merely held to the appropriate standard of care. A second important difference is that in a "plan and spec" relationship, the design professional has a business incentive to report to the owner any problems observed with the contractor or the construction, whereas in a design-build relationship, the opposite incentive often exists. It may thus be important to an owner to provide for independent inspection of the project and to ensure that the design-build contract imposes specific loyalty requirements on the design-builder.

Experience with design-build construction has shown that here ordinarily are several benefits including:

- There is greater participation by the constructor during the design process, often resulting in a more cost-effective design.
- Communications between the design and construction personnel are facilitated, resulting in minimization of overall project duration and more effective transformation of design concepts into construction reality.
- The owner enjoys single-point responsibility and does not have to mediate disagreements between the designer and constructor over responsibility for specific aspects of the project.
- Projects tend to be less adversarial than plan and spec jobs, particularly those where the construction contract is awarded as a result of competitive bidding.

The phases of work.

Most construction and real estate lawyers recognize the typical phases of work for a commercial construction project. The Design Phase is usually broken down into Schematic Design, Design Development and Contract Documents phases. The design is usually followed by a Bidding or Negotiation Phase; in fast-track projects, this phase and some actual construction occurs during the Construction Documents Phase. The final phase is the construction, ending in Substantial Completion, and subsequently Final Completion after the punch list work is finished.

The phases of an industrial design-build project are roughly analogous. The three design phases are usually called Process Design, Preliminary Mechanical Engineering and Detailed Mechanical Engineering. The next phase is usually Procurement, because there are usually critical items of equipment with long lead times which must be ordered as soon as possible. This is followed by the Construction Phase, which ends with Mechanical Completion and subsequently Final Completion after punch list work has been finished. In turnkey contracts, there is usually a Start-Up Phase between Mechanical Completion and Final Completion.

Fast-tracking is particularly common and appropriate for industrial design-build construction contracts. These projects are usually equipment-intensive in that specialized pieces of equipment usually are the major item of cost and have the longest lead time for construction scheduling purposes. Furthermore, the designer is able to obtain greater cooperation from vendors when the designer is the entity that will be ordering the equipment. Thus, substantial procurement frequently occurs long before completion of the mechanical design.

Two Primary Business Issues

Although it is always a broad generalization to identify any number of specific issues as being the "most important" in a contract or business relationship, there are usually two business issues in industrial design-build construction contracts that tend to determine the philosophy of the contract. The first issue is the degree to which the design-builder is responsible for the process itself. The second issue is the nature of the financial arrangements: whether payment is to be based on a lump sum or on a cost-plus-fee arrangement, with or without a guaranteed maximum price.

Responsibility for the process.

The parties' allocation of responsibility for the process is a major factor in determining the philosophy of and relationships in the design-build contract. The process on which an industrial construction project is based may be so proprietary or specialized that the owner may have considerably more expertise in the process and its functioning than the design-builder's engineering team. In such a situation, the owner, rather than the design-builder, will ordinarily retain responsibility for the adequacy of the process and plant start-up. However, the process may instead be the property of the engineer or be within the engineer's special field of expertise, in which case it is more usual that the design-builder will take responsibility for the functioning of the process, usually on a turnkey basis.[1] Alternatively, the process may be relatively generic or widely known, in which case the parties will allocate responsibility for the process based on other factors.

When the design-builder takes responsibility for the process, a turnkey relationship is usually the most logical because of the design-builder's greater knowledge and expertise. The design-builder becomes responsible for not only design and construction of the plant, but also plant testing and start-up. Often, the design-builder will be required to warrant that the completed facility will produce specified a quality and quantity of the product over a given period of time. Such turnkey contracts often include requirements that the design-builder train the owner's personnel in the operation of the plant and provide ongoing consulting services after completion.[2]

On the other side of the spectrum, the design-builder may have no responsibility at all for the process. Start-up may not occur until after Final Completion, or if it occurs earlier, the design-builder's personnel may not be involved. As long as the equipment is properly specified and installed and performs within design parameters, the owner may bear responsibility for making the plant operate.

Of course, responsibility for the process can be divided or shared. The owner may be responsible merely for providing an appropriate chemical formula or theoretical process, and the design-builder may undertake responsibility to design various types of equipment and interfaces theoretically able to implement the process. Other variations are possible as well. In general, the less clear the distinction between the owner's and the design-builder's process responsibilities, the more difficult it is to provide solutions or remedies in the contract in the event that the plant does not function properly.

The design-builder's degree of responsibility for the process may also affect the nature of its contractual relationships with the owner and subcontractors. For example, a design-builder with no responsibility for the process often prefers to view the project as merely an investment of its personnel's time and to minimize its risks on other aspects of the project. Thus, an engineering firm asked to design and build an industrial project may prefer the contract to be a design/procurement/construction management agreement, in which it is not legally responsible for the performance of the construction subcontractors, who may be prime (or legally responsible directly) to the owner. In contrast, a design-builder who agrees to guarantee the process will likely be far less averse to absorbing some construction risk as well (and will likely prefer having contractual control of subcontractors), and its fee will likely include factors for these risks, rather than merely being a function of hourly personnel expense.

Financial arrangements.

The method by which the design-builder is compensated has significant impact throughout the contract. As in commercial construction, the two most common compensation methods are "lump sum" and "cost-plus." Because there has been considerable discussion of these payment methods in the literature on commercial construction, this article will focus primarily on the applicability of these methods to industrial design-build construction.

There is a hybrid payment method, "cost-plus with a guaranteed maximum price," that combines many of the advantages of both methods from an owner's point of view. When costs approach or exceed the guaranteed maximum price, the contractual relationship more nearly resembles a lump sum contract, in that payments are made based on percentage completion and money may be held back because of the likelihood that the construction cannot be completed within the stipulated maximum. When there is little danger of the costs exceeding the guaranteed ceiling, then the guaranteed maximum price becomes mostly irrelevant and the contract more nearly resembles a pure cost-plus arrangement.

For some design-build contracts, it is either impossible or unwise to stipulate a lump sum or guarantee a maximum price. Since the contract is often prepared and signed before the design work has begun, or at least when it is not very far along, establishing a construction price may be pure guesswork. A too-early stipulation of a lump sum or maximum price may cause the design to be unduly conservative, resulting in a project of lower quality than what the budget would allow. One solution is to perform some or all of the design work on a cost-plus basis, with a procedure or option for converting the contract to a lump sum (or for guaranteeing a maximum price) when the engineering has progressed sufficiently to enable such an estimate to be made. Although there is risk to the design-builder from agreeing to a fixed price at too-early a stage in the design, the risk to the owner is greater: the design-builder will usually include a large safety margin, which the owner is often powerless to dispute, when it quotes a lump sum, that will likely translate into a windfall for the design-builder.

The method of payment may significantly affect the entire structure of the contract. One of the most obvious examples is change orders. Except to change completion dates or to record changes in the construction documents, there is no need for change orders in a pure cost-plus project. Since all construction costs are reimbursed, there are no "extras." In a lump sum contract, change orders would be provided for unforeseen conditions, but, unlike a "plan and spec" job, errors or omissions in the plans and specifications would be the design-builder's own responsibility, not the basis for a change order.[3] In a cost-plus project with a guaranteed maximum price, the change order process is similar to that in a lump sum contract except that it is not the contractor's compensation that is adjusted, only the guaranteed maximum price.

A less obvious consequence of payment methods is the nature of the design-builder's relationship with its subcontractors. In a lump sum project, there is no need to require the design-builder to competitively bid its major subcontracts. In a cost-plus context, however, the design-builder does not necessarily have an incentive to contract with the least expensive subcontractors unless there are express contractual provisions requiring competitive bidding of major subcontracts and awards based (at least in part) on price. The same is true of contracts with equipment suppliers and other vendors.[4]

In cost-plus contracts, the concept of reimbursements spills over even into the area of damages and liability. The design-builder may be reimbursed even for its costs involved in correcting defective work performed by subcontractors.[5] Although such a provision may seem foolish from an owner's point of view, generous provisions as to which costs are reimbursable may result in a lower overall fee for the project. Carried to a not uncommon extreme, an owner may agree to waive any remedies it may have against the design-builder under a pure cost-plus contract for problems which are the fault of a subcontractor or material supplier. Although such an agreement undercuts one of the major attractive features of design-build construction to an owner, namely single-point responsibility, it is consistent with a design-builder offering a low fee for a project, calculated as a function of its personnel's time without any premium for attendant construction risks.[6]

Important Contractual Provisions

Obviously, there is no single or best way to structure an industrial design-build construction contract. However, an important consideration applicable to virtually all such contracts is to devise a means for describing and including the owner's criteria for the project in the agreement. These are usually largely technical provisions, beyond the ability and training of most lawyers to draft. A common solution is for the owner's technical staff (or consultants) to prepare a "Job Specification," containing the technical requirements for the project, which is then incorporated into the contract. Since the Job Specification might require ongoing input from the design-builder or information not yet available, a procedure should be devised whereby the still-evolving requirements of the Job Specification become part of the contract, usually after both parties have approved them.

There are two schools of thought regarding the number of documents (excluding exhibits and those incorporated by reference) that will constitute the agreement. One school prefers all of the legal terms to be consolidated into a single contract, which simplifies reviewing the contract to find particular provisions. The other school prefers the

contract to be separated into a short Agreement and longer General Conditions, in the general style of AIA (American Institute of Architects) construction contracts. The Agreement contains the project specific terms, such as price, time, etc. The General Conditions contains those terms that are likely to be common to all similar projects, thus simplifying the task of creating a new contract for a new project.

Whichever style is chosen, there are certain topics that any complete industrial design-build construction contract must address. The most important of these topics include:

- The relationship between the owner and design-builder.
- Budget establishment and control.
- Engineering and design responsibilities.
- Procurement responsibilities.
- Construction responsibilities.
- The owner's duties and responsibilities.
- Subcontractors and vendors.
- Scheduling issues.
- Inspection and quality control.
- Compensation and the payment process.
- Change orders and claims.
- Plant start-up and transfer of control.
- Warranties.
- Indemnification and insurance.
- Termination/suspension of the project.

Of course, there are numerous other issues that a well drafted industrial design-build construction contract may address, such as ownership of documents, confidentiality, dispute resolution and many others. The following portion of this article will suggest and discuss certain specific clauses and issues likely to be of greatest interest to an attorney drafting an industrial design-build construction contract.

Design and Performance Criteria.

In general, an owner's description of its criteria for a design-build project is stated as performance criteria, which specify how the plant must operate when construction is complete (i.e. number of widgets of particular description produced per unit of time). Usually, these design and performance criteria are far more specific and may include specialized requirements like life-cycle costing as well as more general descriptions of the appearance and nature of the facility. Almost invariably, this information must be supplied by the owner's technical employees or consultants.

Particularly in turnkey contracts, it is common to specify certain tests that the completed facility must pass before it can be deemed mechanically complete. The tests are usually derived from the most important design and performance criteria but need not require demonstration of the facility's entire design capacity. Many contracts require the turnkey contractor to demonstrate only that the facility can achieve and maintain a given percentage of its design capacity. The initial performance of the plant may not reflect its true capacity because it often takes time to train personnel to operate a facility so that the design criteria can be fully achieved.

Periodic Reports.

It is to the advantage of both the owner and the design-builder that there be a regular process of documented reporting. The reports may be in a prose format or they may be organized in a quantitative, chart-like manner. The design-builder ordinarily prepares them monthly (or sometimes at the end of each phase or sub-phase), and they contain information about the status of design or construction, current estimated costs, projected completion date for the project or various milestones, and a summary of substantive decisions or events that have occurred since the last report.

The periodic reports serve several functions. They update the owner as to status of the project, both as to cost and time. The owner can see the impact of the various events or decisions made during the last reporting period and can make a "mid course correction" (such as implementing cost-saving measures or ordering acceleration) in order to avoid exceeding the project budget or scheduled completion date. For the design-builder, the reports serve the function of documenting decisions made on the project and their consequences in the event of a future claim or disagreement regarding responsibility for the consequences of the various events or decisions made.

Subcontracts and Purchase Orders.

Many states, such as Illinois, have little or no mechanism for the owner or design-builder to assert a claim against a party with whom they are not in privity of contract. A subcontractor may have mechanic's lien rights directly against the owner, but the owner often does not have a comparable direct claim against the subcontractor for

defective or incomplete work. It is particularly important for the owner to be able to establish a direct relationship with subcontractors and vendors when the design-builder is not legally responsible for the performance of the subcontractors.

The simplest solution is to require all subcontracts and purchase orders to state that the owner is a third-party beneficiary of the subcontract or purchase order respectively. Lower tier subcontracts or purchase orders, to which the design-builder is not a party, may also state that the design-builder is a third-party beneficiary. The owner and/or design-builder should reserve a right of review and approval of all subcontracts and purchase orders of any tier in order to verify that the proper language is included.

When the contract provides that the design-builder's liability for the acts or omissions of its subcontractors and vendors shall be limited to some extent, the owner's interest in the specific terms of each subcontract and purchase order increases, because the owner is more likely to be required to seek a remedy directly from the applicable subcontractor or vendor. In such circumstances, the subcontractor's or vendor's financial stability and insurance become very important, and the owner should consider requiring a performance and/or payment bond. Even the scope of work and substantive terms of the subcontracts and purchase orders should be reviewed to make sure that the design-builder has "bought out the job" completely and accurately, particularly if the design-builder's liability for having failed to do so is significantly limited.

Quality Assurance and Quality Control.

Although these issues are among the most important in an industrial design-build construction project, provisions incorporating them are also among the most difficult to draft because it is very difficult to define a standard of quality using merely descriptive language. Although it is usually the owner who desires to ensure that the design-builder's work attains the appropriate standards of quality, a well drafted provision can also protect the design-builder when an owner who is willing to pay only for a "Chevrolet" standard of quality later complains of the design-builder's failure to use "Cadillac" components.

There are several possible ways to draft quality control standards for the contract, many of which require the participation of the client's technical staff. There are certain nationally published quality standards (*i.e.* ANSI[7], ASTM[8], etc.) which, if appropriate, may be incorporated into appropriate portions of the contract. The contract may also include the concept of a "reference unit," such as a similar facility that the owner and design-builder agree is of a quality comparable to that desired for their project. Alternatively, quality standards and control could be defined by an inspection or review process to be performed by qualified personnel affiliated with the owner or design-builder, or with a neutral third party.

Limitation of Design-builder's Liability.

Many design-builders include in their proposals and insist in subsequent negotiations on some kind of limitation on their liability for various risks connected with a project. The nature and extent of the limitations are almost always negotiable, but at a minimum, few design-builders are willing to accept full liability for consequential and indirect damages arising out of the owner's related business or ongoing operations. The amount of such potential liabilities is usually unrelated to the size and scope of the construction project and would, at least theoretically, force the design-builder to increase its price substantially or pay substantial premiums to insure against this possibility. Thus, an owner desirous of securing a more attractive price for the construction project will often be willing to bear all or much of this risk itself.

Design-builders may distinguish among different kinds of risks in determining the degree of responsibility they are willing to accept. It is not unusual for a limit of liability to be imposed on claims by the owner against the design-builder but not on indemnification against claims by third parties. Particularly when a design-builder is not performing any construction labor with its own forces, it may desire to limit the amount of money which it might have to pay to subcontractors or vendors to correct defective work yet be willing to commit its own employees' time and efforts without any limitation to the correction of defective work.

The amount of liability that a design-builder is willing to accept for various risks depends on several factors. One important factor is the availability of insurance to cover the risk. Often, limits of liability are established as a function of anticipated profit to be earned by the design-builder. Business judgments and the competitive marketplace may also play an important role.

One particular risk that usually justifies separate treatment in the contract is the design-builder's liability for construction and related defects caused by its subcontractors and/or vendors. Since one of the primary advantages of design-build construction to an owner is single-point responsibility, an owner will ordinarily desire the design-builder to bear legal liability for all acts or omissions of subcontractors and vendors. On the other hand, design-builders who prefer an engineering/procurement/construction management

approach in which they subcontract all of the construction labor prefer that any claims arising out of subcontractor or vendor activities be made directly only against the subcontractors or vendors responsible. Creative compromise positions may be negotiated, such as the design-builder being only secondarily liable for such claims in the event that the owner's initial claim against the responsible subcontractors or vendors is not successful.

Warranties.

As discussed earlier, design-build contracts are treated more like construction contracts than like contracts for professional services in that the law implies a warranty of adequacy on the design-builder's services. Most design-build contracts restate this warranty in explicit terms to clarify its scope and duration.

A common mistake is to confuse this warranty of adequacy with the design-builder's "call-back warranty." The warranty of adequacy, in general terms, is the design-builder's guarantee that construction materials and equipment are new and free from defects, that constructions services are of a good and workmanlike quality and that the design is free from unreasonable defects and will accomplish the purposes intended. The call-back warranty is the design-builder's agreement that if defects in the project should become apparent after completion, most commonly for a period of one year following mechanical completion, the design-builder will return to the site to make any necessary repairs or adjustments.

The call-back warranty is for a limited period of time, but the warranty of adequacy has no time limit. If a latent defect does not manifest itself until two years after completion of the project, the owner should still have a claim for breach of the warranty of adequacy. This warranty attaches at the time that the defective work was incorporated into the project and does not expire except as set forth in the applicable statutes of limitations or repose.

There are numerous other warranties in typical design-build contracts paralleling similar warranties in engineering and construction contracts. There may be warranties of experience, licensure and authorization. The design-builder warrants title to the property and to the construction work to protect the owner against mechanics' liens. There may be other warranties in connection with the payment process or various certifications.

In a turnkey project, the design-builder normally provides some kind of performance warranty. For example, for a manufacturing facility, the design-builder might warrant that the plant can produce a certain number of widgets of a specified quality within a unit of time and maintain the performance for a certain number of consecutive hours or days. It is usually wise for a design-builder to structure the contract so that this warranty can be discharged by the facility passing certain appropriately designed tests after mechanical completion. As noted earlier, when an owner takes over a turnkey facility, there is often a learning curve that may initially depress the facility's performance.

Another common mistake in drafting performance warranties is overlooking certain variables that are not within the design-builder's control. Superficially, it would seem that if the design-builder is guaranteeing the process, design, equipment procurement and construction of the project, then the design-builder should be able to warrant that the facility will perform properly. However, the nature of the process should be examined closely to determine whether there are any factors being supplied or controlled by the owner or third parties, such as raw materials, or other assumptions not within the design-builder's control. Any performance warranty should be conditioned on all factors outside the control of the design-builder being in accordance with reasonable design assumptions.

Dispute Resolution.

A great deal has been written on this subject, which is far too complex to cover in detail in this article. However, the design-build relationship often puts a slightly different spin on many of the issues involved in drafting dispute resolution procedures.

- Owners and design-builders often have long-standing relationships resulting in several projects over a period of years. In such a relationship, both parties have an incentive to resolve disputes by negotiation and compromise rather than by a "declaration of war."
- It is important for the dispute resolution provisions to state that the design-builder must continue work on the project, without stoppage or slowdown, despite the pendency of any disputes and during the dispute resolution process.
- Unless the owner either has or hires significant inspection capability, the design-builder is likely to be able to make up any losses that occurred or became known early on the job by cheapening the quality of construction as the job progresses, particularly since the design engineer is not reviewing the construction work for the benefit of the owner. It may therefore be in the owner's interest to have a dispute resolution procedure that is flexible, allowing for "horsetrading," or at least

postpones the formal taking of positions on issues until later in the project.

- Protracted litigation of any dispute is invariably expensive, and smaller companies often cannot or are not willing to undertake such a burden. When one of the parties to a design-build contract is considerably larger than the other, it usually increases the larger party's leverage to require litigation of disputes in court.
- The corollary of the prior point is that nobody is a winner in protracted litigation. Both the owner and design-builder should give serious consideration to some of the modern methods of preventing or resolving disputes, such as partnering, Disputes Review Boards, Step Negotiations (requiring executives of both companies senior to those involved in the project to meet and negotiate), mediation and other alternative dispute resolution procedures. Experience has shown that even disputes that appear to be unresolvable, with the parties' positions "miles apart," can usually be negotiated to a successful conclusion through mediation or one of its variants, as long as both parties are acting in good faith.

Conclusion

Design-build construction, particularly for complex or specialized industrial facilities, has many advantages over traditional forms of project delivery. Its use is increasing substantially, and many professionals in the industry predict that it will soon be the dominant method of project delivery. At present, the standard design-build contract forms published by construction industry trade organizations do not sufficiently reflect the realities of the marketplace and have not succeeded in generating any consensus as to common or equitable resolution of the business and legal terms. As a result, even more than in commercial construction or ordinary "plan and spec" projects, it will be important for lawyers to be familiar with the issues and dynamics of design-build construction so that the resulting contracts will best serve their clients and the construction industry.

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Endnotes

[1] When the process is supplied by a third party engineering firm which is otherwise not deeply involved in the project, the owner usually becomes responsible for the process, at least with respect to the design-builder. However, if the third party "process designer" has a business relationship with the design-builder rather than the owner, the design-builder may accept responsibility for the process as necessary to market the project to the owner.

[2] Sometimes the design-build contract (or a separate agreement) may provide for the design-builder to manage and operate the completed facility.

[3] The doctrine of "betterment" or "enhancement" may be an exception to this rule. A design-builder may argue that an omission on the plans and the extra construction necessitated when it is discovered would unjustly enrich the owner if the owner were not required to pay for it by an additive change order. In a "plan and spec" job, the contractor's argument would generally be correct, and the owner would be liable for the cost of the enhancement even if the designer's omission was negligent. See, *St. Joseph Hospital v. Corbetta Constr. Co.*, 21 Ill. App. 3d 925, 316 N.E.2d 51, 58-63 (1st Dist. 1974). However, in a design-build context, the owner's position is more persuasive than usual: the design-builder is warranting both the design and construction process, and an omission in the plans arguably is conceptually equivalent to an omission from a contractor's estimate before signing a lump sum agreement -- ordinarily not the basis for a change order.

[4] Even cost-plus contracts frequently require some or most subcontracted work to be bid on a lump sum, unit price or similar basis.

[5] Since subcontracts are typically lump sum, the subcontractor would have to absorb its own extra costs involved in repairing or replacing defective work. However, the design-builder, particularly one that performs little or no work with its own laborers, may be entitled to reimbursement for its costs incurred in resolving the problem.

[6] A common misconception in the industry is that it is appropriate for a design-builder to accept significant potential risks and liabilities (such as responsibility for a subcontractor's or vendor's improper performance) only in a lump sum contract, and that such risks and liabilities do not belong in a cost-plus contract. The reason is that lump sum contracts provide significant profit potential to offset the risks, whereas cost-plus contracts supposedly do not. At least in theory, this reasoning is flawed. A cost-plus contract may have comparable profit potential by increasing the fee, usually calculated as a percentage of reimbursable costs, to offset any risks or liabilities agreed to. Even the nature of the fee can be modified, such as by providing incentive bonuses, to balance any risks or liabilities undertaken.

[7] American National Standards Institute.

[8] American Society for Testing and Materials.