

ALTERNATIVE PROJECT DELIVERY PROCUREMENT MODELS AND AGREEMENTS

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PROCUREMENT AGREEMENTS

I. ALTERNATIVE DELIVERY SYSTEMS

Contract delivery systems can be broken down into three main categories:

- A. Traditional
 - Design/Bid/Build
 - Negotiated Select Team

- B. Construction Management
 - CM as Advisor
 - CM as Agent
 - CM as Contractor

- C. Design/Build
 - Design/Build
 - Design/Build by Developer
 - Design/Build “Bridging the Gap”

Each contract type has advantages and disadvantages and can lead to conflict.

Project structure and contract type should be chosen on a project-by-project basis, taking into consideration each individual situation.

External project uncertainties include inclement weather, political risk, acts of God and force majeure.

Internal project uncertainties include negligent construction/design, site access conditions, incomplete definition of scope, delay, COS and geotech conditions.

A. TRADITIONAL DELIVERY METHODS

1. Design/Bid/Build

- Importance of compatibility of contracts
- Owner engages Architect to develop design and prepare plans and specifications for construction
- Construction documents used for bidding
- Owner separately hires a GC for construction
- 3 parties: Owner/A/E/GC
- May or may not be statutory or corporate policy requirements to accept the low bidder.

(a) Advantages:

- Widespread use
- Familiarity
- Clear roles assigned to each party
- Completion of design prior to bidding, allowing for certainty of fixed price contract
- Linear process

(b) Disadvantages:

- Lengthy process
- Separation of design and construction restricts communication
- Claims for extras, COS and delay are typical, especially in fixed price contracts
- A/E in an inherent conflict of interest position

2. Negotiated Select Team (“Design-Assist” Or “Value Engineering”)

- Sometimes referred to as “design-assist”
- Parties: Owner; A/E; contractor
- Involves 3 phases
- Separate contracts
- Owner selects an architect to design the project
- Owner selects a GC to build the Project

- Design documents completed by architect, with input from the GC, along with maximizing construction efficiencies through design, scheduling, cost estimating, phasing and system evaluation
- When the design is complete, the final construction cost is negotiated through bids from subs
- Contractor then builds the project
- Most often employed on private sector projects

(a) Advantages

- A cooperative team approach
- The availability of construction expertise during the design phase
- A reduction in the usual adversarial relationships between design and construction, with accordingly less potential for litigation

(b) Disadvantages

- Informality
- Without competitive bidding from the GC, Owner may question whether they have achieved an economical construction price
- Possible ambiguity of roles, responsibilities and phasing

B. CONSTRUCTION MANAGEMENT DELIVERY METHODS

1. CM as Advisor

- Parties: Owner, CM, A/E, Contractor
- Owner contracts with an architect to prepare design and construction documents
- After design is complete, or concurrent with the preparation of the design, the Owner contracts with the CM
- CM advisor oversees the design in terms of its implications for cost, schedule and constructability (value engineering)
- Important to ensure that roles of CM and project A/E are compatible practically and contractually:
- Construction documents are used for construction bidding or negotiation
- GC is selected with the advice of the CM and A/E
- Owner engages a GC to build the project
- CM remains as an advisor through completion of construction with the A/E performing contract administration and certification function
- This construction method is more appropriate for large, complex projects than those that are relatively small and simple

(a) Advantages

- Direct contractual relationships with the Owner
- Careful monitoring of costs and schedule, and continuous oversight through a linear process that is easy for Owners to manage

(b) Disadvantages

- Added cost of an additional consultant
- Possible confusion of traditional roles between CM and A/E if contracts are not compatible
- Relatively lengthy process and more complex relationships

2. CM as Agent

- Parties: Owner, CM, A/E, GC

- CM is hired by Owner to act as his agent and to oversee all project activities through the completion of construction
- The architect is engaged through the CM as agent for the Owner
- Architect designs the project and produces the Construction Documents
- Important to ensure that overlapping roles of CM and A/E on the Project are properly coordinated contractually
- Project is bid or negotiated to select a general contractor or a series of trade contractors, who are engaged by the CM as agent for the Owner
- GC builds the Project
- Infrequently employed

(a) Advantages

- Appropriate for absentee owners and private owners who do not wish to be involved in the day-to-day responsibilities of project construction
- Single point of responsibility (the CM and the A/E)
- Management expertise of CM can shorten project time line

(b) Disadvantages

- Direct communication between Owner and A/E and between Owner and GC may be suppressed
- Additional cost
- Overlapping roles of CM and A/E can be complicated if contracts not compatible

3. CM as Contractor “CM at Risk”

- Often used in fast-track project situations
- Parties: Owner, A/E, CM
- Owner contracts with architect for project design
- When design is about 30% complete, scope of the work Construction Documents are prepared
- Project is bid in order to select a CM/Contractor
- Owner engages the CM/GC to advise during pre-construction and to build the Project
- When the Construction Documents are complete, the CM/GC will usually rebid some or all of the construction to trade contractors

(a) Advantages

- Good for Owners where cost, schedule or construction is expected to be complicated to manage, or where a project is to be fast-tracked
- Initial focus on design issues
- Construction advice during the design process
- Careful control of costs and schedule
- Early cost commitments
- Opportunities to shorten the overall project schedule

(b) Disadvantages

- Potential for adversarial relationships
- Potential for COS
- Potential for delay claims from low-bidding prime or trade contractors

C. DESIGN/BUILD DELIVERY METHODS

1. Design/Build

- Parties: Owner, D/B
- Single point of responsibility for the Project by one entity having both design and construction capability
- Pre-selection materials prepared, including Owner's Project Performance Requirements or Performance Specifications prepared and disseminated to potential D/Bs
- Owner chooses from a selection of D/Bs who bid based upon Owner's Project Performance Requirements or Performance Specifications
- Difficulty of comparing bids
- Design is completed by Architect who is a part of or who contracts with the D/B entity
- Construction is also the responsibility of the D/B
- Most D/B work is done to a fixed price

(a) Advantages

- Good for Projects that require to move quickly
- Effective when Owner's Performance Specifications or Project Requirements are clearly defined
- Relatively complex and requires extensive coordination of D/B's consultant and subcontractors
- Single point of responsibility (D/B)
- Reduced likelihood of COS
- Reduced likelihood of construction delays

(b) Disadvantages

- Not for Owners who wish to have continuing design and scope input through construction
- Complex for Owners with limited construction experience
- Lack of direct connection between the Owner and the Architect
- D/B's cost-saving strategies could erode design and construction quality

- Like placing “mouse in charge of the cheese” – D/B Contractor judging quality and quantity of own work
- Difficult to arrange surety bonding

2. D/B by Developer (Turnkey)

- Two parties; Owner, D/B
- Owner prepares pre-selection Project Requirement materials and contracts with the D/B developer
- D/B puts the development deal together, by acquiring land, obtaining financing and obtaining permits from authorities having jurisdiction
- D/B designs the building and completes construction
- D/B maintains and operates the building until all systems are functioning, and then transfers legal title to the Owners
- Turnkey concept includes land assembly and project financing (Sale-lease back)

(a) Advantages

- Good for public and private owners who do not wish to take financial responsibility for a project until it is complete
- Good for projects that can be clearly defined at the outset
- Good for projects that need to be completed as quickly as possible
- Minimal financial and legal risk for the Owner
- Early guarantee of construction cost
- Single point of responsibility
- shortened overall schedule

(b) Disadvantages

- Lack of direct Owner participation
- Complexity for less experienced Owners
- Difficulty of preparing adequate pre-selection materials, including Project quality and performance standards

3. D/B – “Bridging The Gap”

- Parties: Owner, Owner/s A/E, D/B

- Owner engages A/E for preliminary design (conceptual and schematic) of the project and to complete a biddable set of drawings and performance specifications called “scope of work” documents
- Project is bid or negotiated to select a D/B that will complete the design documents and the construction
- The D/B’s A/E completes the design and becomes the “A/E of Record”
- D/B’s contractor builds the Project
- Owner’s A/E remains involved to ascertain appropriate monthly payments to D/B and quality of construction
- Important to ensure that the “turnover” of responsibility from the Owner’s A/E to the D/B’s A/E is contractually clear, with the latter to assume all design responsibilities, and with the latter to have quantity and quality certification powers

(a) Advantages

- Good for public and private Owners who wish to maintain the advantages of contracting with an A/E and having a “say” in the D/B’s design process (conceptual and schematic), while gaining the advantages associated with D/B
- Focused attention to design issues
- Competitive bidding
- Single point of responsibility
- Owner is not left to “mercy” of D/B during construction

(b) Disadvantages

- Complexity of bridging procedure
- More extensive management by the Owner
- Possible conflict between the Owner’s A/E and the D/B
- Potential for short-term cost-saving strategies to outweigh building and construction quality

II. WHAT DOES DESIGN/BUILD MEAN?

The basic concept behind a design/build construction contract can best be understood by comparing it to a traditional construction contract. The typical contract involves a three-party arrangement between an owner, design professional and contractor. The owner hires a design professional to design the structure and then the contractor to construct the project according to the design plans and specifications. In so doing, the owner warrants the sufficiency of the plans and assumes any liability for defects for them to the contractor. The contractor is then responsible for defective construction and workmanship, but is free from any liability for design defects. The design professional, while responsible for design, does not assume any liability for defective construction, other than for his failure to detect such defective construction as should have been obvious to him through the course of his field services rendered during the construction operations.

By contrast, in a design/build contract, the owner enters into a single agreement by which the design/build contractor agrees to perform both the design and construction of the project. In some instances, the contractor may also agree to be responsible for acquiring land, financing the project and leasing the finished structure. This more comprehensive arrangement is often referred to as a “turnkey” contract. In either a design/build or turnkey arrangement, the contractor’s objective is to satisfy the owner’s broad performance specifications rather than to adhere rigidly to the design professional’s plans and specifications. As well as being responsible for faulty workmanship in construction, the contractor is also liable for any deficiencies in design under this arrangement.

The design/build contractor may be composed of a joint venture of a contractor and a design professional, or it may be a contractor acting alone as the prime design/build contractor who in turn engages design professional sub-consultants. Either way, the owner is looking to the design/build contractor for the full package of design and construction services.

In the turnkey or “package deal” design/build arrangement, the owner may find it convenient to engage an independent third party professional advisor to advise on the design offered by the design/build joint venture of contractor/engineer at the pre-contract stage, and perhaps to supervise construction to ascertain compliance with the owner’s

project requirements. The third party advisor may also be required to make valuations for the purpose of determining interim payments under the design/build arrangement. It is often thought necessary to engage such a third party (be he project manager, engineer or quantity surveyor) because of the inherent conflict of interest that pertains when a single entity, the design/builder, is responsible for the total package of design and construction on behalf of the owner, with no one to protect the owner's best interests.

III. ARGUMENTS IN FAVOUR OF THE DESIGN/BUILD ARRANGEMENT

From an owner's perspective, the design/build contract provides a single source of responsibility. The contractor has singular responsibility for both construction and design defects. The owner can recover directly from the contractor for deficiencies in either design or construction of the project. Therefore, the owner need not determine initially whether a defect was caused by an error in design or construction. In a more traditional construction contract, this issue must be resolved so that the owner can determine whether the design professional or the contractor is at fault.

Another feature favourable to the owner is that the contractor bears any additional costs that may occur as a result of using defective or inadequate plans prepared by his engineer. Because the owner warrants the sufficiency of the plans in a typical construction contract, he is liable for any increased costs because of defective or inadequate plans. In a design/build contract, the contractor is responsible for design as well as construction and agrees to meet the owner's performance specifications rather than merely build the structure. Thus, if the plans are inadequately designed, the contractor is then unable to look to the owner for additional compensation.

A third advantage of a design/build contract is that the project can often be completed within a shorter period of time than with the traditional three-party arrangement since the construction can begin before the entire plans and specifications are completed. This time savings results from designing the project in phases so that the contractor can begin work on the initial phase of the project while the later phases are being designed. No corresponding time savings occur in a three-party contractual arrangement because the contractor often does not even bid, much less begin work, until the design professional has finalized the plans.

Still another advantage is that the contractor's increased control over a design/build project may result in lower overall costs. Since a design/build project can be designed and constructed in phases, the contractor is able to order necessary materials for subsequent phases ahead of time, perhaps at a reduced cost. In addition, his control over design details allows the contractor to use familiar construction methods and processes in building the structure, with the result of much more efficient construction. These savings ultimately benefit the owner.

Although owners may believe that the need for independent professional representation will be greatly reduced under a design/build scenario, the possibility of eliminating third-party 'quality control' by the owner may be dangerous, as the party now responsible for completing the work as quickly and 'cheaply' as possible (the design/build contractor) also has control over the passing of the quality and quantity of the work. This is a little like placing the mouse in charge of the cheese.

In the design/build arrangement, the responsibility for meeting all local controls, bylaws and legislation can be placed firmly with the design/build contractor, and this usually results in more efficiency in this critical function.

Also, even though the price of the design/build contract is likely to be relatively certain, great care is required if increases in the cost of the work are contemplated in the contract since abuses in this type of situation will be more difficult to detect by the owner and its staff, and control will be far more difficult than in a traditional contract. Most design/build contracts are lump-sum fixed-price in nature, but occasionally the payments will be made on a cost-plus basis.

A problem issue often arises as to when to compensate the design/builder under a fixed-price arrangement. Because it is difficult to ascertain the design/builder's progress, particularly where there may be no independent objective party making such determinations, design/build contracts often provide for payments to the contractor to be based upon the objective achievement of milestone construction events built into the contract.

IV. DISADVANTAGES OF THE DESIGN/BUILD ARRANGEMENT

From the owner's perspective, in a design/build situation it is often difficult to effectively compare the various preliminary design proposals submitted by design/build contractors. The designs will probably not be uniform because there are usually many different methods of satisfying the owner's general needs and performance specifications. In addition, the owner's input on the detailed design of the structure will be limited because the contractor, rather than the owner, is responsible for furnishing the design work. As a result, the finished structure may not be exactly as the owner envisioned. This can lead to later disputes. The owner may be able to alleviate the situation by selecting a preliminary design. If the structure's appearance and detail are of prime importance to the owner, the owner may wish to forego a design/build arrangement and hire a design professional to do the design work separately.

Another disadvantage is that the owner may not obtain the lowest cost for the project since the design/build contract is usually entered into by negotiation rather than competitive bidding. The owner may also find it difficult to induce contractors to produce preliminary designs unless they are compensated for their costs. To guard against the danger of not receiving any payment if the owner does not accept the proposal, a design/build contractor will often require that a formal payment arrangement be agreed upon before submitting a preliminary design.

It is almost impossible to make any genuine assessment or comparison of prices as between design/build contractors where their designs differ. If this is attempted, for example, by putting a project out to tender with the owner's outline requirements specified, the result inevitably is a competition in under-design, with considerations of long-term cost-effectiveness and quality, sacrificed to offering an apparently attractive immediate price.

The under-design referred to above will frequently not be detectable by such professional advisors as the owner may have available. In general, at least as much professional time and expertise is needed to check another person's calculations and design criteria as to prepare the initial design. For the same reason, if detailed checking of the design and specification is attempted, the basic saving in cost of the entire arrangement is likely to prove illusory. Further, the long-term cost of tendering is greatly increased by the

contractor's own consultants or other design costs on unsuccessful tendered designs, which require to be recouped from successful tenders.

Satisfactory standard forms of contract for design/build contracts are not available in many jurisdictions. Hardly any substantive provisions of a traditional building contract do not require radical change in a design/build or turnkey situation. For example, provisions for variations or changes need very sophisticated draftsmanship, since the contractor will need to have the right, subject to safeguards, to vary the specification or drawings should this be necessary to achieve satisfactory permanent work. On the other hand, he will need a power to object, for the same reason, to variations called for by the owner. Again, when considering the provisions for interim payment, instalments payable at fixed milestone stages are really the only satisfactory solution.

The Canadian Construction Association recently published its own standard design/build contract, CCA Document 14. This document purports to recognize the owner's vulnerability to a situation where it has no independent impartial verification of the design/build contractor's work progress and quality of construction. CCA 14 provides for the design/builder to engage a design professional engineer as a sub-consultant. The drafters of the document suggest, in the Guidelines to its use, that engaging the design professional as a sub-consultant, has the effect of establishing the independence and impartiality of the engineer so that the owner is now in a position to receive quality and quantity assurance with regard to the progress, value and quality of the work performed by the design/build contractor. The suggestion is that the designer has an overriding obligation of fairness between both the owner and the design/builder.

In truth, the design professional sub-consultant's "client" (with whom it has a contract) is the design/build contractor, not the owner. The so-called independence of the designer in this situation will prove to be illusory in any situation of dispute between the owner and the design/builder over the value of a payment application or the quality of the work and its compliance with the owner's project requirements.

Satisfactory long-term contractual protection with regard to the suitability of the work and its design is rarely if ever offered in design/build contracts, and bonding or insurance of such an obligation is likely to be either commercially unobtainable or prohibitively expensive. It will be important to the owner on one of these projects to understand the extent of coverage provided by the design builder's liability insurance, that is, both the

contractor's and the design professional's insurance. Even if the owner can prove that an imperfection in the finished product resulted from a design or construction defect, the owner may be unable to recover anything if either the contractor's assets or its insurance coverage is insufficient to compensate the owner.

In a design/build contract, the contractor is liable for both design and construction. Thus, most contractors carry commercial general liability insurance and all-risks course of construction insurance to cover damage claims resulting from their work. An important consideration for the owner is that almost all contractors' liability insurance policies do not cover property damage to the project that is caused by defective designs, plans and specifications prepared by design professionals. On the other side of the coin, most if not all professional liability policies covering engineers in design/build operations, do not cover damage caused by defective or deficient labour, materials or equipment incorporated into the work by the contractor during the course of the construction operations.

As far as warranties are concerned, what is often offered by the design/build contractor in these arrangements is a warranty for a limited period based on a concept of professional negligence. Having regard to the fact, however, that the design/build contractor, unlike a true consultant, is under commercial and financial pressures to 'design down' as far as possible, subsequent failures of the building are inherently more likely, and with such a limited warranty are likely to produce litigation in which the issue will be whether the economy of the design exceeded the limits of professional responsibility at the time, often a controversial question of fact. What most owners look for in this situation is a warranty guaranteeing the suitability of the building for its known purpose, independent of fault.

V. INVOLVEMENT IN TURNKEY INDUSTRIAL PLANT PROJECTS

In the design/build arrangement, a design/build contractor will have a legal responsibility for the design, construction, quality, structural soundness, durability, suitability and satisfactory performance of the complete work. This will usually involve a single comprehensive contractor for the entire project. Under such an arrangement, the design/build contractor will be responsible for the design and suitability for the intended purpose of the project as a whole. It is also possible under these arrangements for the owner to employ independent design professionals in order to obviate the conflict of interest problem discussed earlier. The owner may have his own in-house technical employees, which would leave the design/build contractor responsible only for completion of the work in strict accordance with the owner's or his independent professional's designs and specifications, and not, in the absence of poor workmanship or materials, for its subsequent performance or suitability after completion. This is more akin to a traditional design/bid/build project delivery system.

Owners may also wish to retain a right, by one means or another, to select specialist subcontractors or suppliers or sources of plant or machinery. In such cases, the exact allocation of the design responsibility for that part of the project as between owner, contractor and subcontractor or supplier, will depend upon the express provisions of the principal design/build contract. Usually, design/builders will resist the owner's attempt to nominate subcontractors, preferring instead to employ those subcontractors whom it regards as most reliable and from whom it can obtain the best back-up warranties and guarantees. If owners wish to deviate from standard design/build protocol and directly engage speciality subcontractors and suppliers, this can be done, but such a practice comes with a price. If any of these direct engagements result in the supply or installation of defective materials or equipment, the owner may have a direct claim against each party, but will also have to deal with the design/build contractor's claim that it has suffered delays and adverse construction consequences as a result of the activities of the owner's "other contractors." In principle, there is nothing to prevent owners from obtaining overlapping express design responsibilities from more than one person as, for example, by obtaining direct contractual guarantees from selected subcontractors or suppliers or manufacturers, as well as an unqualified design or performance obligation from the principal design/build contractor.

Coordination is often another problem on industrial plant projects. What arrangements should be made for the coordination of the various construction or supply elements involved in the project? Quite apart from any question of the design arrangements, should there be one comprehensive contractor or should the project be subdivided into separate direct contracts with the owner, with the owner responsible for coordination, either through his own organization or by employing his own design professionals? If the design/build contractor takes responsibility for coordination then he will be fully responsible to the owner for coordinating the design and construction operations through the various subconsultants and subcontractors or providing the owner with the finished plant within the time and budgetary constraints provided by the design/build contract. This will be subject, however, to the finger-pointing referred to in the previous paragraph, when an attempt is made to attribute responsibility for delays and other construction problems.

In contracts for plant and machinery, unless a class of design professionals is available in the market to assist an owner, design services for at least some parts of a project will, as a commercial reality, require to be obtained from a manufacturer, supplier or specialist contractor. Thus, the layout and machinery and equipment of a steel plant is often likely to be both designed and supplied by an experienced industrial manufacturer with a proven record of success. If an engineer, for example, enters into a joint venture relationship with such a supplier or manufacturer then he will, in the design/build contractual arrangement with the owner, bear joint and several liability with his joint venture partner supplier/manufacturer for supplying a product which is fit for the purpose for which it is intended and for warranting the success of the overall project. In such a case, in the absence of express contractual provisions to the contrary, it will be of the essence of the manufacturer's or supplier's legal responsibility that he will in such a situation, independently of any question of fault on his own part, impliedly warrant his products' suitability for its required purpose. That the engineer should become jointly and severally liable for such an obligation beyond his own normal legal obligation to use reasonable care, skill and diligence known to the state of his art at the time that his services were rendered, is indicative of the far greater liability exposure that pertains in design/build arrangements for the engineer.

Where an owner may have independent advisers to assist him in preparing detailed outline specifications and drawings showing the owner's requirements for the project, this will not affect the suppliers and the design/builder's implied design and suitability

obligation to produce a design or project meeting those requirements. In effect, the design/builder's design obligation is exactly the same as that of the seller or supplier of goods upon those skill and judgment the purchaser has relied. This involves far greater legal responsibility than that taken on in a typical contractual mandate by a consulting engineer.

VI. THE ROLE OF THE SURETY

In the construction industry, the surety bond is nothing more than a mechanism for spreading the risk and associated cost throughout the industry. It is, however, more accurately characterized as a credit guarantee than as an insurance policy.

Design-build/turnkey projects present three significant problems to the surety:

1. It is often difficult to determine the exact scope of the work. One solution that has been proposed to deal with the lack of sufficient information is so-called “incremental bonding”. This would involve issuing bonds for each of the respective phases of a project. One problem of such a solution is that it requires continued vigilance by the owner to ensure that the contractor is continually updating his bond. Secondly it is reasonably foreseeable that a project could reach a point where the surety would refuse to bond it further. As a result, incremental bonding is rarely employed as a solution;
2. The cost of the separate functions of design and construction are often not allocated. The proposed solution is for the owner or surety to require an allocation of the separate costs; and
3. The absence of an independent engineer representing the owner to certify completed work opens the door to non-conforming work and improper payment of contract funds.

The latter is generally recognized as the most difficult problem facing the surety. In traditional construction contracts, the owner and surety have an independent observer to protect them from improper payment. However, in design-build/turnkey contracts there is no such independent party to certify payment and the potential for abuse in this situation is great.

VII. SUMMARY AND CONCLUSIONS

In summary, highly specialized high technology heavy industrial plant projects and manufacturing process projects may effectively dictate the use of the design/build approach, due to the absence of any available class of consultant to provide the essential specialized design. In such cases, owners will have little alternative but to buy the contractor's design and product in a turnkey or design/build form. Even in relatively conventional construction projects, owners often find themselves under commercial and sales pressure, such as promises of lower cost or greater speed of construction, to use the design/build approach, leaving the design to the contractor. The principal advantages of design/build appear to be the following:

- (a) Since the design will be prepared by the person who will also be responsible for construction, there is single-point joint and several responsibility and less difficulty in attributing fault.
- (b) The design can be expected to take full account of access and construction problems, and the particular way in which the contractor plans to carry out the work. In principle, therefore, such a design should offer both savings in cost and speedier construction.
- (c) Savings may be offered on the professional side, since the preparation of a detailed design will no longer be carried out by the owner's consultants or other advisers. Also, owners without adequate technical resources of manpower, whether in the form of consultants or their own in-house technical departments, may find such contracts attractive.
- (d) Design/build contracts virtually dictate a cost plus or lump sum approach to pricing, since it would be commercially unwise for an owner to accept a unit price contract in a case where the original estimated contract quantities have been provided by the contractor himself. In such a case, there would be no certainty or safeguard as to their accuracy, unlike a conventional contract situation. As a consequence, most design/build arrangements will tend to be lump sum in nature, with the lump sum

feature meaning that they will usually offer greater certainty as to final cost.

- (e) Payment by fixed instalments at certain milestone stages, rather than by evaluation, may be justifiably required in lump sum contract arrangements.
- (f) In the event of a post-completion failure of the project, the owner will not be concerned to discover whether the failure is due to the design on the one hand or defective work or materials on the other. In conventional contracts, inadequacy of the design will afford a defence to the contractor, and even against the professional designer it would be necessary to prove negligence or fault, not the mere fact of failure of the design. It should be pointed out, however, that very few design/build contractors in fact offer a satisfactory unqualified design guarantee. The favourite express qualification being to reduce it to a 'professional negligence' level.
- (g) In the event of a post-construction failure of the project, the financial resources of a design/build contractor available to meet the owner's claim will, in many cases, be greater than those of a professional individual or firm.

The major disadvantages of design/build are as follows:

- (a) In the traditional design/build situation, there is no independent party to protect the owner's interests.
- (b) There can be little or no check on the reasonableness of the price.
- (c) If a detailed check of the design and specification is attempted, the basic savings in cost by way of reduced fees will not occur.
- (d) Where it has proven possible to make a comparison of conventional and design/build prices, there is little evidence that design/build contracts designed in the light of the contractor's proposed construction methods

have in fact produced savings in cost to the owner, though there is considerable evidence that the speed of construction may be superior in these types of contracts.

- (e) Design/build contracts require to be very carefully drafted if ultimate certainty of the lump sum price is to be achieved.
- (f) If the owner wishes to use design/build contracts under competitive tendering procedures, the cost of tendering is enormously increased since all contractors will have to engage design or consulting personnel to prepare and submit competing designs, and the design costs of the unsuccessful tenderer will, in the long-term, need to be recoverable in the prices of their successful tenders.
- (g) Satisfactory standard forms of contract for design/build contracts are not readily available.
- (h) A substantial loss of control by the owner inevitably takes place during design and construction. Even in a case where a consultant is engaged to supervise the project independently of the design/build contractor, it will be extremely hard for him to assess claims for variations or interim payment, or for disruption and extensions of time, or to identify and reject defective work or materials or to administer any termination clause based upon defective work or delay.
- (i) Satisfactory long-term contractual protection with regard to the design, suitability and performance of the work is rarely if ever offered by design/build contractors, and satisfactory bonding or insurance of such an obligation is likely to be either commercially unobtainable or prohibitively expensive.

VIII. AVAILABLE ALTERNATIVE CONTRACTUAL ARRANGEMENTS

Because of the joint and several liability factor inherent in the design/build contractual form of relationship, wherein a design professional would become jointly and severally liable with its contractor joint venture partner for the failure of the project to achieve the owner's requirements, one would expect that designers would look at alternatives which might provide similar benefits to the owner, while reducing the level of exposure inherent in the traditional design/build form of arrangement.

One of the methods that could be used to effect such a solution would be to have the owner contract directly with a general contractor for a total design/build package. The general contractor would in turn engage a design professional as a subconsultant to provide the design portion of the design/build package. In this way, there would be no contractual relationship between the professional and the owner of the project, and he would act only as a professional engineer in providing design and field services in connection with the design/build arrangement offered by the general contractor to the owner. This would allow the designer to retain coverage for its actions pursuant to its current errors and omissions professional liability insurance policy, without the need of special design/build errors and omissions insurance endorsements. The disadvantage of this concept, of course, is that the designer's major responsibility would be to its client, the general contractor, and not to its traditional client on these projects, the owner. As a result, any field services provided by the designer in a quality control or evaluation of the work role would be suspect in the eyes of the owner due to the inherent conflict of interest presented by this contracting scenario. Also, as a sub-consultant to the builder, the chances for involvement by the design professional in future construction disputes are significantly increased as he is now working for the party responsible to guaranty the work and its fitness and suitability for its intended purpose. However, he would no longer be jointly and severally responsible to the owner for the work.