INTERNATIONAL CONFERENCE ON
BOO/BOT CONTRACTS

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IMPLEMENTING THE BOT PROJECT: THE DESIGN/BUILD CONTRACT

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(IMPLEMENTING THE BOT PROJECT: THE DESIGN/BUILD CONTRACT)

by

Charles B. Molineaux[1]

I

INTRODUCTION

In the chain of contractual activities which implement BOO and BOT contracts, from the early financing packages to the much later turnover and maintenance agreements, it is rather obvious that the actual construction contract which puts the project in place is pivotal.

When the financial arrangements and projected revenues indicate that it is a close call to judge a project's economic feasibility, it will often be the case that the construction cost will be the determining factor as to whether or not the project goes ahead.

It is, accordingly, appropriate to examine and compare the contractual formats available traditionally and available more recently to effect the actual construction of the project. As the best known and most widely used forms, those of the Fédération Internationale des Ingénieurs-Conseils ("FIDIC") will be surveyed in this paper.

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II

DESIGN-BUILD - IN FASHION

To talk about design-build is suddenly, in a certain way, in fashion. By that we do not mean to say that it has just been discovered that design has to precede construction. That is self-evident. We are speaking of procurement - the purchase of design services, equipment, construction services and the parties which provide them through a series of contract relationships, sometimes simple and sometimes complex indeed. We should bear in mind at the outset that for construction a contract might be roughly said to do three things. 1) establish scope, 2) establish price, and 3) allocate risk and responsibility. We should also bear in mind that a construction contract, even a large one, might be between private parties or involve a public entity. This is often an important distinction because when public money is involved there are policy considerations which do not necessarily concern the private purchasers or employers. Not least is the policy goal of protecting the public purse, or getting the "biggest bang for the buck" by fostering competition and openness in the procurement process.

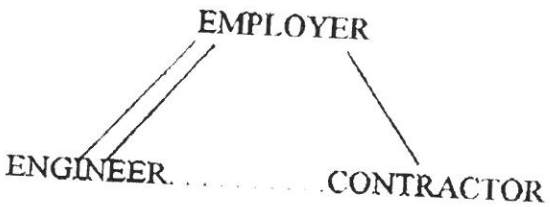
The crux of the design-build concept as we speak of it today is in contractually establishing the so-called "single point of responsibility." This term has great appeal in a time when we are all looking to simplify the complexities of construction procurement. It also suggests that we can fix responsibility in a way that will reduce disputes and eliminate lawyers from the process - always a worthy goal. We shall discuss the purported advantages and the purported disadvantages of the design-build procurement concept and interject some cautionary caveats.

III

THE "TRADITIONAL" CONSTRUCTION PROCUREMENT APPROACH

To appreciate and evaluate design-build, let us briefly distinguish it from what we call the traditional approach or what some call "design-bid-build" We can think of this in two ways:

1) the traditional triangle - which, we might say, illustrates the usual and key contractual relationships as found, for example, in the "Red Book" of FIDIC (*i.e.*, conditions of contract for works of Civil Engineering Construction).



2) A simple bar chart - which illustrates the sequence of design-bid-build (and which design-build usually seeks to compress)

Design

Tender Preparation/And Review

Construction

IV

THE DESIGN BUILD APPROACH

1) What the design-build contract does is to collapse the traditional triangle and merge the role of the engineer (or the roles of the engineer as pre-construction designer and as employer's representative (agent and quasi-arbitrator) during construction) with that of the contractor

EMPLOYER

|

CONTRACTOR (DESIGN-BUILD)

Proponents of design-build say that this reduces the complexities and tensions arising out of the tri-lateral (not tripartite) arrangement of design-bid-build. No longer the mutual finger-pointing where (e.g., when a field problem arises and work stops) the engineer blames the contractor, the contractor blames the engineer, and the uncertain employer has to pay. The traditionalist, if you will allow the term, would say that the tension, or balance of power or checks and balances, between engineer and contractor is a useful and constructive tension ensuring that the quality prescribed by the contract specifications is incorporated into the structure.

2) It is also contended by the design-build aficionados that time is radically reduced - some would say time is cut in half - because preliminary work can be under way, in the foundation, for example, while the design continues, say, of the roof.

Design

Construction

Another use of design-build is to obtain particular technology which may be available only from certain suppliers of equipment - the "black box", so to speak, owned by company X which may have proprietary data or patent rights not otherwise available.

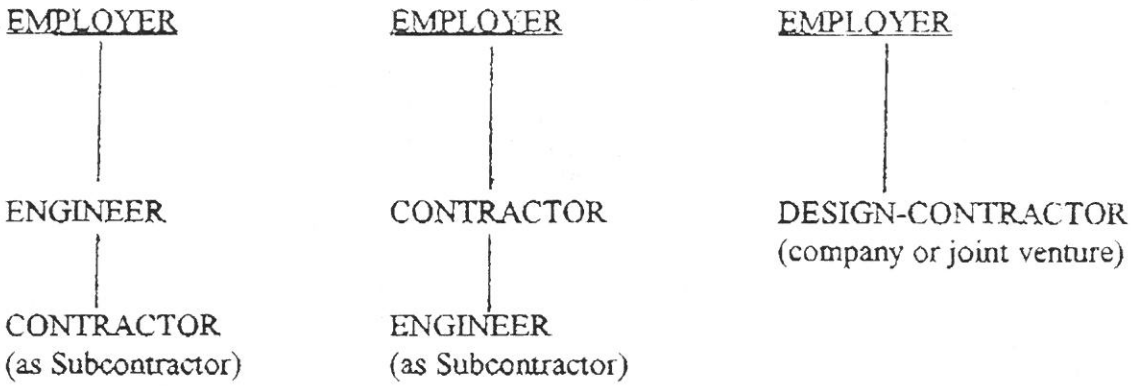
Now the difficulties can be seen to emerge. The employer or owner must know what he needs and be able to set out his requirements with some specificity. Otherwise, at the end of the day, he may have bought a facility or a plant or a technology which is not adequate for his needs, over built for his needs, expensive to maintain, or not achieving the quality or quantity of product needed for the plant to be economically feasible. This eventuality and the unhappy avenues of recourse must be planned for at the time of contracting.

This obviously flags and emphasizes the critical importance of the employer's requirements statement or "owner's brief", or "conceptual design" as some would term it These terms are all used in design-build but are not necessarily synonymous.

The point to note here is that there is a wide range of competence among various sorts of employers. Many will have highly trained and experienced design and construction departments well able both to advance the design of a project to a certain point (we can speak about certain recommended percentages of design) and to monitor the construction in the field. But other employers will have no technical staff at all - a local school board, which constructs once in a decade, would be an example.

There is another consideration in the public sector It can be said for public-civil works construction, of the low-tech variety such as road building or other infrastructure work, that in most countries the industry is open - we like to say there is ease of entry for the ambitious entrepreneur with a pickup truck and a wheelbarrow This fosters competition Some would say that the new entrant, the new player, bids low because of limited experience, is awarded the job but goes bankrupt along the way and causes grief for the employer and deprives the responsible tenderers of work One short answer to that unhappy scenario is the management of a courageous prequalification process, before contract, and careful monitoring of progress after contract award.

But a question remains - where does the design-builder come from and is the trend to design-build necessarily anti-competitive? Here we have to look at the potential structures for the design-build contractor. There are three basic possibilities:



There is thus an opportunity for the contractor without design capability and as well for the engineer without the gambling instinct, who prefers to avoid risk and remain a provider of professional services only. In effect, there would seem to be roles both for the smaller engineers, pessimists by nature and the smaller contractors, optimists by nature. These are stereotypes - in

North America we now see all varieties of formations with some engineers becoming entrepreneurial indeed.

V

FIDIC CONDITIONS OF CONTRACT FORMS

Standardizing of construction contract conditions has distinct benefits. A well developed form can serve as a checklist for the preparer of the contract so that all essential matters are addressed; save time for the tenderers who, also looking over a familiar form, will then not have to look for pitfalls and notice traps (and may even be able to avoid consulting counsel); and impart confidence that the construction risks have been allocated in a recognizable and balanced way.

In this respect it is useful to note that, in the process of periodically revising its contract conditions, FIDIC does not merely issue an update by executive fiat but consults with representatives of contractors' groups and, for the employer's perspective, consults as well with various international financing institutions, particularly the World Bank. Thus hammered from the right and the left, FIDIC generates what are considered to be balanced documents which are extensively used.

For the particularly widely used Red Book, the Fourth Edition emerged in 1987. It is a standard, enjoying acceptance and copying around the world, even where its FIDIC origin is not realized. The World Bank, as one important example, bases its Standard Bidding Documents, mandated for borrowers on large projects, on the FIDIC Red Book Conditions of Contract.

VI

THE DESIGN-BUILD AND TURNKEY CONDITIONS

The Orange Book, published in 1995, like all FIDIC documents, has essentially been prepared by engineers, for use by engineers; FIDIC hopes that its use of legal patois has been minimized.

For the design-build approach, however, FIDIC had to do more than fine tune and improve a well-known, if somewhat Victorian form. There were already other design-build forms in existence but the balance was sought which had been found in the Red and Yellow Books.

What has emerged from FIDIC after much study is a form of contract which is intended to be usable for a range of types of projects - that is, from manufacturing plants to buildings (private office buildings as well as public hospitals and schools) to civil works such as toll roads. In a sense, the form is necessarily somewhat generalized.[2]

Unlike the Red Book which was originally (1957) based on the British Institution of Civil Engineers' form of contract and then successively updated in later editions (to the 1987 Fourth Edition) while maintaining its basic structure and clause numbering, the Orange Book is a fresh start. Obviously, the design-build concept, with its single-point-of-contact feature is a quite different project procurement approach from that of the traditional FIDIC triangle - i.e., design-bid-build.

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[2] Although directed to the procurement of design and construction where tenders are to be made on an international basis, the conditions are usable for domestic projects. (It will be recalled that when FIDIC published the Fourth Edition of the Red Book in 1987 it intentionally deleted the designation "international" which had appeared on the cover of the Third Edition.) This document and other FIDIC publications can be purchased from the FIDIC Secretariat, Post Office Box 86, 1000 Lausanne 12, Switzerland (fax: 41 (21) 653-5432).

VII

RISK ALLOCATION

Basically, of course, the core of the Orange Book is in its allocation of the design as the responsibility of the contractor. The role of the FIDIC "Engineer", so substantial in the Red Book arrangement, is greatly reduced. By way of acknowledging this reduction, the entity charged with monitoring the contract for the owner is called the "Employer's Representative" (Orange Book, Clause 3). The Employer's Representative, when he is required to determine value, cost or extension of time is required to endeavor to reach agreement, failing which he shall "determine the matter fairly, reasonably and in accordance with the Contract" (Orange Book, Sub-Clause 3.5, captioned, "Employer's Representative to Artempt Agreement"). This is obviously a different and lesser standard than that found in the Red Book which requires of the "Engineer" that, "he shall exercise such discretion impartially within the terms of the Contract and having regard to all the circumstances" (Red Book, Sub-Clause 2.6, captioned, "Engineer to Act Impartially"). In fact, it is evident that the Employer's Representative under the design-build arrangement could even be an employee of the owner, this would not be tolerable under the Red Book, or is at least contrary to its intent, where the Engineer is expected to be professionally detached and truly an independent entity or person.

It is evident that a key variable in design-build is the degree of design, if any, which will be performed by the owner's staff or retained engineering consultant before proposals are requested from contractual tenderers. The pivotal document, which in other places but in similar contexts might be termed the "design brief" or the "owner's concept", is called the "Employer's Requirements" in the FIDIC design-build Conditions. It is the description of the particular requirements for the works -

their scope, standard, design criteria and program, as expected by the owner. Obviously, depending on the project, this document could consist of a single sheet of paper describing the end goal to be reached or it could consists of many sheets of drawings and books of specifications.

The predictable problem area in this type of arrangement will be at the interface - the point at which the design, in outline so to speak, of the owner meets the detailed design of the design-build contractor. We might here note the recommendation of the American Consulting Engineers Council in its 1994 policy paper: "The design professional shall prepare design criteria, analyses, reports and cost estimates for the proposed project. ACEC recommends that the design professional shall develop the project design requirements to approximately the 35% design level" [sic].

The Orange Book form is generalized enough to be used for a variety of projects, both as to type and location. This adaptability means, of course, that its Part II, Conditions of Particular Application, will take on special importance.

VIII

THE EMPLOYER'S ROLE (Orange Book Clause 2)

Stating the "Employer's Requirements"

The Employer's role begins well before the point at which he furnishes the site and starts to make payments to the Contractor – the two general obligations which begin Clause 2. (*See* General Obligations, Sub-Clause 2.1.) Clearly the most important, the pivotal, document in the entire design-build process is the statement which furnishes the description of the "Employer's Requirements" – the scope, standard, preliminary design (if any) and programme of work to be accomplished. This is the document, sometimes called the "Owner's Brief," or the "Conceptual Design" (the term used

by the EIC), on the basis of which the contractors' tenders are prepared and against which they are evaluated.

It is defined in Clause 1 of the Orange Book:

> 1.1.1.2 "Employer's Requirements" means the description of the scope, standard, preliminary design (if any) and programme of work as issued by the Employer and included in the Contract, and any variations thereto.

In the Orange Book, Part II, sample conditions of particular application are set forth together with guidance notes. With respect to the Employer's Requirements, FIDIC suggests, at Clause 1, as follows:

> The Employer's Requirements should specify precise requirements for the completed works, including quality and scope, and may require the Contractor to train personnel and/or to supply certain items, such as consumables which could be listed in a Schedule. The matters referred to in some or all of the following sub-Clauses might be included:
>
> 4.4 Other contractors (and others) on the Site
>
> 4.7 Setting-out points, lines and levels of reference
>
> 4.14 Programme periods for Employer's Representative's approval
>
> 4.18 Environmental constraints
>
> 4.19 Electricity, water, gas and other services available on the Site
>
> 4.20 Employer supplied machinery and materials
>
> 5.1 Criteria for design personnel
>
> 5.2 Submission of proposed construction documents for Employer's Representative's approval

5.4 Technical standards and building regulations

5.5 Submission of samples for Employer's Representative's approval

5.6 As-built drawings and other records of the Works

5.7 Operation and maintenance manuals

6.6 Facilities for the Employer's and Employer's Representative's personnel

7.1 Manner of execution

7.4 Testing during manufacture and/or construction

9.1 Tests on Completion

11.1 Performance Tests

14.5 Provisional Sums

Providing the site and paying the Contractor are usually basic obligations of the Employer. It does happen that the contractors could be asked to come up with a proposal for a site and to arrange financing as well. When the site is furnished by the Employer, the Orange Book provides that its possession may not be exclusive (Clause 2.2). If it is to be exclusive or exclusive for a time, this is to the contractor's advantage and the clause language can be amended.

The contractor may request the assistance of the Employer in applying for requisite permits and licenses (Clause 2.3); this leaves the responsibility ultimately with Contractor.

The Employer's Representative (Clause 3)

It is obvious, as mentioned, that the role of the Employer's Representative under the Orange Book is a far cry from the traditional role of the Engineer under the Red Book. (Some observers had thought that the Engineer already had his role reduced in FIDIC "Red Book 4" as compared to its

earlier editions, partly because of new language there calling for "due consultation" by the Engineer before making certain determinations. The FIDIC Red Book committee position in 1987 was that the role of the Employer had been made more visible but that the role of the Engineer had not been eroded.) What is significant is that there is no language (as in the Red Book) calling for the Employer's Representative to exercise his discretion impartially. Rather, the language at Sub-Clause 3.5 reads:

> **Employer's Representative to Attempt Agreement** 3.5 When the Employer's Representative is required to determine value, Cost or extension of time, he shall consult with the Contractor in an endeavour to reach agreement. If agreement is not achieved, the Employer's Representative shall determine the matter fairly, reasonably and in accordance with the Contract.

IX

THE CONTRACTOR'S RISK ALLOCATION (Orange Book Clause 4)

Fitness for Purpose

As indicated, the "single point of responsibility" feature of design/build places the design responsibility with the contractor. But, that having been said, what is the standard to be applied to the exercise of that responsibility? That is, will the contractor be required to exercise the normal skill of a design professional or meet the higher standard of warranting the fitness of the end product – of his design-construct effort – for the purpose intended?

Here the industry forms diverge, as one might imagine. The FIDIC Orange Book imposes a high standard, as follows:

> Clause 4: The Contractor.

General Obligations

4.1 The Works as completed by the Contractor shall be wholly in accordance with the Contract and **fit for the purposes for which they are intended**, as defined in the Contract. The Works shall include any work which is necessary to satisfy the Employer's Requirements, Contractor's Proposal and Schedules, or is implied by the Contract, or arises from any obligation of the Contractor, and all works not mentioned in the Contract but which may be inferred to be necessary for stability, completion, and the safe, reliable and efficient operation of the Works.

The Contractor shall design, execute and complete the Works, including providing Construction Documents, within the Time for Completion, and shall remedy any defects within the Contract Period. The Contractor shall provide all superintendence, labour, Plant, Materials, Contractor's Equipment, Temporary Works and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of defects. (Emphasis added.)

It is useful to note that other forms of design-build conditions express the contractor's standard of care obligation differently:

The form of the Associated General Contractors of America states that the contractor "shall exercise reasonable skill and judgment in the performance of its services." (AGC 410, Article 3.)

The conditions of contract of the European International Contractors state that, "the Design and the Works shall be executed and completed by the Contractor with due care and diligence in accordance with the Contract." (EIC Turnkey Contract, Clause 4.1) and the Contractor will construct the Works, "with due diligence and with workmanship and materials of a good quality in accordance with the Approved Design to meet the requirements of the Contract (ibid., Clause 4.3).

The form of the Engineering Advancement Association of Japan (ENAA) for industrial plant construction calls for the contractor to guarantee that the minimum level of the Functional Guarantees be achieved during testing as specified in the Agreement (failing such tests the contractor shall modify and/or change the plant as may be necessary, at its costs and expense)

A glance at these other design-build forms, therefore, indicates that the new FIDIC form imposes a stricter standard on the design builder. When it is considered that the FIDIC forms are generally used in developing countries, it is apparent why the forms are appropriately protective of the Employer's interest.

X

FURNISHING PERFORMANCE SECURITY (Orange Book Clause 4.2)

Particular attention should also be directed to the question of performance security. The provisions as to what might be called the formal performance security are different in emphasis from what appears in the current edition of the FIDIC Red Book for civil works.

Recall that for performance security, the assurance to the Employer that the project will be completed in accordance with the contract, the Employer has more than one avenue. There is provision for retention from sums already earned and there is the normal time lag between performance and payment. In the case of a measurement form of contract such as the Red Book, for example, we notice that the Engineer certifies quantities for payment 28 days after work performance (Sub-Clause 60.2) and the Employer makes payment 28 days later (Sub-Clause 60.10) – a period, one hesitates to say a "delay," of virtually two months. If the Engineer is carefully monitoring the progress of the Contractor this usually means that the Employer has available to him, in a sense, the sums earned since the last progress payment but not yet paid as well as the retained percentage on

all work performed. It might even be argued that having a bank guarantee or bond from a third party would be merely additional protection, perhaps less readily available than having the contractor's cash in hand, and perhaps not contractually necessary in every project.

In the Red Book, FIDIC contemplates the possibility that a formal instrument may not be required: Clause 10.1 reads, rather conditionally: "If the contract requires the contractor to obtain security for his proper performance of the contract, he shall obtain . . . etc."

In the Orange Book, however, FIDIC's recommended language is explicit: Clause 4.2 reads, "The Contractor shall obtain, at his cost, a performance security from a third party, in the amount and currencies specified in the Appendix to Tender . . . etc." The reason for the different language is evident enough – with the design responsibility in the Contractor, the imposed obligations are greater and the need for Employer protection more extensive. It is a difficult situation for the Employer to have to find a substitute contractor in the event of default; it would be far worse to find a substitute design-builder if design is partially complete.

Unforeseeable Sub-Surface Conditions

Thus having imposed on the Contractor the fitness-for-purpose standard and having imposed on the Contractor the requirement of furnishing performance security, it will come as some relief to the contractors to learn that the Orange Book provides relief for unforeseeable subsurface conditions. The clause at 4.11 of the Orange Book is similar in language and intent to that at 12.2 of the Red Book. Clause 4.11 reads:

Unforeseeable Sub-Surface Conditions

4.11 If sub-surface conditions are encountered by the Contractor which in his opinion were not foreseeable by an experience contractor, the Contractor shall give notice to the Employer's Representative so that the Employer's Representative can inspect such conditions. After receipt of such notice and after his inspection and investigation, the Employer's Representative shall, if such conditions were not (by the Effective Date) foreseeable by an experienced contractor, proceed in accordance with Sub-Clause 3.5 to agree or determine:

(a) any extension of time to which the Contractor is entitled under Sub-Clause 8.3, and

(b) The additional Cost, which shall be added to the Contract Price, and shall notify the Contractor accordingly.

About Time

One of the major responsibilities of the Contractor is to perform "within the Time for Completion," this being a defined term (Clause 1.1.3.4), meaning the time for completing the execution of, and passing the Tests on Completion of, the Works or a Section as stated in the Appendix to Tender, or as extended (under Clause 8.3). The time-related clauses must, of course, be read together and this includes the Clauses at 1.1.3.4, at 4.14 (Programme) and at 8.1 through 8.11 (Commencement, Delays and Suspension).

The clause at 4.14 requiring that the Contractor submit a schedule or programme, for information, is considerably more detailed than the comparable Red Book clause and mandates that the programme be "developed using precedence networking techniques, showing early start, late start, early finish and late finish dates. . . ." Although the opening of Clause 4.14 states that the

programme is submitted to the Employer's Representative "for information," that is, not for approval, it is this programme which can become the basis, if the progress of the Works does not conform, for an instruction to the Contractor to revise the programme, showing the modifications necessary to achieve completion within the Time for Completion. Presumably the "modifications," in Clause 4.14, to the programme might involve modifications in the order or sequence of the Works, including acceleration of the Works. The word "acceleration," which some might consider emotive or suggestive of claim, does not appear.

Conclusion

Because of the variables implied in design-build as a contracting process, such as the degree of design embodied in the Employer's Requirements or whether those requirements have been prepared in the nature of performance or design specifications, the most thoughtful preparation of the tender documents on behalf of the Employer must take place. The roles of the parties have to be understood and provided for so as to avoid both duplication and unnecessary overlapping of effort, on the one hand, and omissions of aspects of responsibility, on the other. Part I of the Orange Book provides the basis. The interface has to be clearly enunciated by competent contract drafting administrators (with engineering help and, pace engineers, perhaps legal help) in Part II.

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