

Bringing Design Build Procurement to Port Development

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ABSTRACT

This presentation discusses Design Build procurement, the different role plays of the port designer from that of traditional procurement, importance of appropriate Owner Requirements, contract form and bid evaluation process. Design Build allows the Designers the opportunity to increase their skill set to design more cost efficiently, incorporate innovation, adopt alternative and safer build methods and to meet tighter Contractors' schedules. Owner's Representatives need to have skills beyond those of traditional project managers, providing independent valued advice rather than a design centric response, to ensure that the Owner's Requirements and budgets are being met and complied with. Risk identification, assessment and valuation enables a Contractor to provide a cost certain delivery. An exemplar case study project demonstrates faster, more efficient and less costly delivery process while maintaining highest quality with minimal work changes. How to best achieve cost certain delivery, reduce Owner risk, early partnering and comparison between traditional procurement and DB procurement highlighting the advantages and disadvantages of both processes are also covered.

INTRODUCTION

Design Build has been commonplace in Europe, particularly in the UK over the last forty years. Its origins can be found in all the facets of construction that cannot or are not achieved with a more traditional Design-Bid-Build form of contract. These traditional forms of contract, where the Architect or Engineer is designer and often contract administrator, have their place for certain projects however the demands of commercial Owners, speed of modern construction, and the ability to react, the Architect or Engineer cannot deliver alone. As part of the delivery team under the leadership of the Contractor, the Architect and or Engineer still has an extremely valuable role to play.

Only one member of the delivery team can guarantee quality, cost and time: the contractor. Yet he is often the last person invited to the table. The longer the Contractor is part of the team prior to the works starting on site, the more he can influence the design and associated costs and buildability of that design and reduce or eliminate risk and provide the Owner with cost certainty.

Too often the Contractor is left out of the picture early in the process, with the design developed from an Owner's brief, by the Architect, Engineer and Cost Consultant. The Owner has a requirement, the Architect interprets, the Owner asks how much? Remember, the Owner often recalls the first number you tell him.

With the design team assembled, they develop the design, referring to the Cost Consultant as appropriate, possibly (and hopefully) being directed by the Owner's Representative, but nobody yet knows at this stage the real cost. What will the construction market tell you how much it will cost? How will the risk will be considered and priced? How long it will the project really take?

There is a tendency to use a design build procurement route to simply offload responsibility. Develop the design, obtain bids from five or six Contractors, drive down price, and expect the Contractor take on all the risk. Accordingly, the successful Contractor will look to find opportunities to save money, cut corners possibly and do the minimum to deliver the project at maximize profit. Sadly this "design and dump" is prevalent in the U.K. and not what design build was developed for. It is the worst scenario for our industry and we must strive to avoid it.

NASA astronaut Alan Shepard who, when asked by a reporter what he thought about while inside the capsule atop the Redstone rocket, he said "The fact that every part of this ship was built by the low bidder." The analogy is true for construction project where likewise it takes over million actions and parts to construct a building.

Once attending a lecture where the speaker, advocating the Design-Bid-Build route stated, "You would not buy a design build car". Well the construction industry has been plagued for decades being compared with the car industry, particularly on quality. A response to that is for the majority of projects (roll out programs and off-site manufacturing excepted) we are building a prototype every time we start a new site, the earlier the full team is assembled the better. If an Owner feels he has to bid the works to provide probity to the public purse or the shareholder's then limit the number of bidders, give them time to bid it properly and sufficient time in the lead up to site activities and let him set the schedule for how and when he will deliver the building.

True Design Build is where an Owner has a requirement, and the thinks he knows what he wants, requires some assistance to formulate that requirement into a brief to approach a Contractor or number of Contractors. However, with the differing permitting regulations and constraints from country to country, that simply doesn't happen. So, the next best thing is to do engage early with an Owner's Representative and selected design team to establish the brief and budget and to develop the minimal design to obtain the necessary build consents. Having gone that step to formulate the brief into a requirement, the risk on the project then needs to be assessed to allow the party who can guarantee quality, cost and time the best opportunity to deliver it.

The prime driver in most construction projects is to deliver cost certainty for either the State or other stake holders. An essential funder or shareholder requirement. To achieve this, the project risks need to be identified, managed and eradicated prior to agreeing the contract. A clear strategy for risk mitigation and management will deliver the cost certainty required on any scheme irrespective of size and complexity. Appropriate high-level cost advice on a project must be provided by a leading authority on the economics

of schemes, the nature of such advice being dependent on project scale, profile and complexity.

Whether giving a simple Owner's Requirement (as will be seen in the case study) or a highly-detailed Owner's Requirement, the result will be the same where excellence in design can be achieved in both. That is despite the project drivers and project risk profile being different. Wherever the risk lies, the Owner, his representative and the design team have to give the Contractor the best possible chance of assessing, quantifying and pricing that risk where it cannot be eliminated. It is the Contractor whose has the expertise is managing and quantifying risk, no one else in the delivery team can.

So, whatever the level of information the Contractor is given, the Owner knows that it is the Contractor who is going to deliver him the finished product. What the Designers and Owner's Representatives must do is to give the time and information to enable the delivery and achieve design excellence and where ever possible encourage the selected Contractor to own the site information.

DESIGN BUILD (DB) v DESIGN BID BUILD (DBB)

With Design Build the contractual and communication routes are different to those of a more traditional Design Bid Build route as can be seen below:

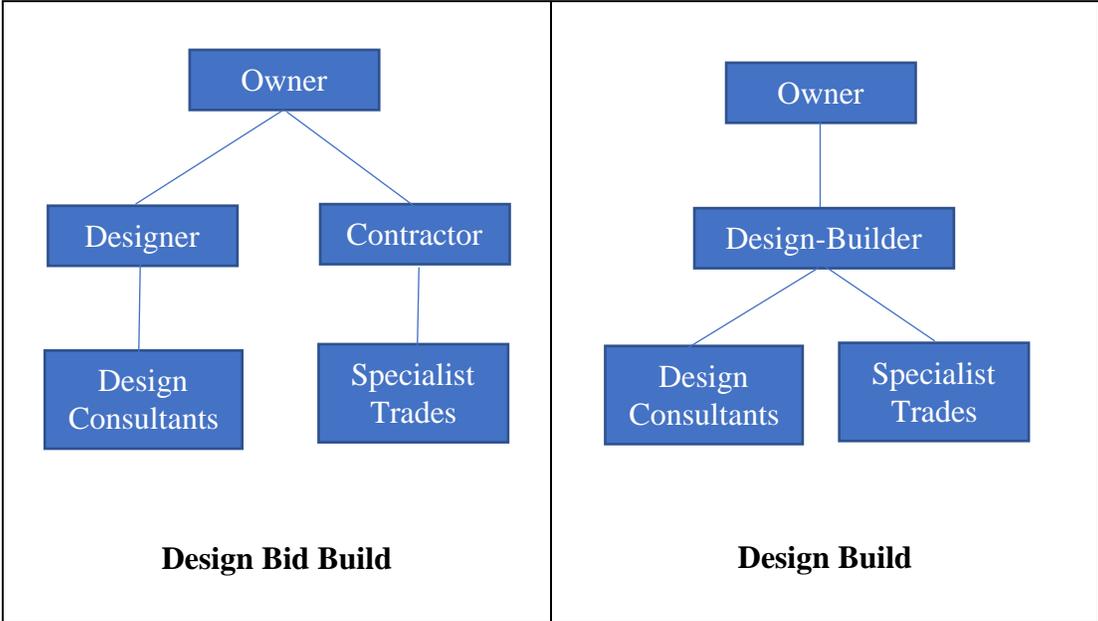


Figure 1 – DBB and BD Responsibilities

This simpler contractual and communication route brings advantages such as:

- Contractor owning risk best achieves cost certainty
- No work change order contracts or time extensions

- Designers encouraged to design what the Contractor can and is able to construct to his best ability as opposed to design what the Designers want the Contractor to build
- Best delivery time
- Best price

However, disadvantages include:

- State Institutions and Authorities unfamiliar with design and build procedures tend to adopt half-baked solutions rendering the design and build advantages inert
- Public bidding procedures often negate selecting bone fide experienced Design and Build Contractors and select by public tender those deemed suitable resulting in often an inexperienced bid list

Research over 351 projects, undertaken for the Charles Pankow Foundation and Construction Industry Institute, has found that “After 20 years, DB (*Design-Build*) projects are still delivered faster and with greater reliability in cost and schedule performance” (Molenaar, K & Franz, B 2018). In detail:

- DB projects were 0.3% less expensive than DBB but more importantly saw 3.8% less cost growth than DBB (Molenaar, K & Franz, B 2018).
- DB projects were 36% faster than DBB and saw 1.7% less schedule growth than DBB (Molenaar, K & Franz, B 2018).

The results when compared against the Construction Management route were more showed greater favor towards DB.

ROLE OF THE DESIGNER

At the advent of Design Build, designers initially had to adapt from their previous role of serving the Owner to serving the Contractor and this has resulted in them being challenged to think differently and to provide alternative solutions to meet the same end requirement. The Architect or Engineer may not be King any more but still plays an important part of a multi-faceted team that working together producing projects with more certainty of cost and time output. The lead consultant can still be (but not always) the lead designer and co-ordinates the design of others into the overall project, but the master is no longer just the Owner.

Unfortunately, many fellow professionals still treat design and build as a threat to their professionalism and status, and this is unfortunate. The same happened in the UK but this has changed, and those initial cynics have been converted and now treat design and build as a normal procurement procedure.

In many cases where time is the essence to give the Owner best value can be to retain the Owner’s Designers through from concept design stage to the construction phase. Language such as “Novation” is now used to ensure that the Designers’ responsibilities are transferred from Owner to Contractor. Still the Contractor must be allowed to accept or refuse any novation as it is essential not to relieve the Contractor from design responsibility where he might argue that “you imposed this Designer on me” to deflect such responsibility.

By novating the Designers, their original appointment to the Owner and associated design responsibilities are transferred to the Contractor. A typical Designer appointment outlines the services that the design will undertake, aligned to the standards of and services defined by their own professional body, their responsibilities and how and when they will be paid. The novation agreement, between Owners, Designer and Contractor, contains language transferring those responsibilities to the Contractor. The Contractor should be aware of both appointment and novation agreement (and any third-party warranty language) and the time of bidding and these should be an exhibit in the Owner's requirements.

Importantly during the execution of the works, should the Designer be witness to anything he feels to be in contravention to either the Owner's requirements or good construction standards, he still has an obligation (as part of his appointment) to the Owner in advising on the issue, despite being under the direction and employment of the Contractor. Some say the Owner still has his spy in the camp!

Where the Designer is novated, important experience of the project is retained, design concept and design intent rational does not have to be re-learned by a new Designer, and most importantly by knowing that they are to be novated, the Designer's concept and intent must be adapted to be buildable.

The downside to novation is that the Designer is protective of the design and may resist the efforts by the Contractor to change materials or alternative methods of construction. A Designer appointed fresh to the project by the Contractor is more inclined to work in the Contractor's interest above all else. This is why the Designers convince the Owners to novate!

A key change in mindset is required from the Designer, the 30%-60%-90% design stages are not necessary or really relevant, with the design and drawing output schedule geared towards the construction schedule, and in particular the Contractor's procurement schedule, to support and incorporate design Subcontractor proposals into the overall design. The design release schedule is Contractor and supply chain led rather than Designer led. So, you don't need the fencing proposals day one!

In summary, the benefits this approach brings cost efficiency and innovation to the design process, this process being informed by Contractor methodology, supply chain improvements and incremental design release reducing overall project time.

OWNER'S REQUIREMENTS

Design Build integrates the procurement team providing Designers the opportunity to increase their skill sets to design more cost efficiently, alternative material use and innovated systems to suit alternative and safer build methods and to the Contractors' schedules. Contract administrators or Owner Representatives have developed skills beyond the traditional cost consultant and take on the "Project Manager" mantle to ensure the Owner's Requirements are being complied with. The project manager is the first responder to the client providing an independent view rather than a design centric response that would possibly be otherwise given.

The skill required in writing an Owner's requirements that transfers risk from Owner to Contractor while maintaining the same quality product should not be underestimated.

Too many projects have failed the Owner's expectations on either quality, cost or time owing to poor requirements. The risk of not having a detailed or appropriate Owner's Requirements in the first instance is the submittal of bids with a wide cost variance and high volumes of clarifications. Once on site this develops into differing interpretations and dis-satisfaction of the built product as well as encouraging cost variances.

The fundamental point is that the information the Contractor receives is a requirement, not a design from which they can build. The onus is on the Contractor to take the requirement and prepare the best possible proposal, driving the design, be it materials or method influenced, for cost efficiency.

It is important in any requirement for the Contractor to "own" the information he is relying on to base his proposal.

Relevant to the Port industry we have seen many clients providing very comprehensive site investigation reports and findings and made them an exhibit in the tender documents. The bidding Contractors were then expected to use these findings to base their bids on. We all know the reliability of site investigation data and their true condition representation. Sadly, such variances in the data provided to that exposed often differ rendering an excuse for project and cost variation. To avoid this such data, if available, should be used as a "guide" and it should be up to the bidders to take ownership of that information or augment it with their own so that the Owner does not become responsible for any site variances and ensuing costs

The passing of risk from the Owner to the Contractor is best achieved by early partnering with a Contractor, including engaging a Contractor to undertake early enabling works to identify and quantify unknown risk. These enabling works can take the form of further site investigations, survey or uncovering works to expose and quantify risks. It is perfectly reasonable for the Owner to pay for these works – he would otherwise have had to do so himself anyway. The point being these works negate further Owner responsibility for any potential erroneous information that the Owner may provide.

CONTRACT / EVALUATION

There are several standard forms of contract to procure Design Build. Internationally the FIDIC (Fédération Internationale des Ingénieurs Conseils) form is used, whilst in the USA, we have working knowledge of the AIA (American Institute of Architects) form and know of the DBIA (Design Build Institute of America) form. The key to any standard form of contract is then not to let the lawyers loose on it however, we would encourage amendment to these forms to secure the cost certain principles we expect.

There is a common trend to invite our legal cousins to pour over standard contracts where often time charge led they tend to seek part rewrite. This is not criticism but an observation as this results in the Contractor having to employ their own legal advisors to unravel the changes, re assess the risk and price accordingly. Bottom line – more costs to the project.

Contractors who are asked to bid, or chosen to negotiate, should be selected according to their suitability for the project. A simple RFQ (Request For Qualifications) will

establish who are the best Contractors based on experience, understanding of Design Build, cost certain delivery, quality benchmarks, project schedule adherence and instances of legal claims

Evaluation of bids to deliver best value rather than lowest cost is a driver of excellence in Design Build. Too many times over budget projects are subject to post bid “value engineering”, however this is misrepresented as cost cutting and brings no value to the client. In practical terms, the case study detailed in this paper is a recent project which had detailed Owner’s Requirements, tight financial spread of bids from a list of very capable Contractors making evaluation and final decision choices about delivery and value rather than simple cost reduction. This case study project also demonstrates that design excellence can be achieved through Design Build procurement, development and execution.

OWNER’S REPRESENTATIVE

The Owner’s Representative operates as an arm of the Owner, however, is independent, and must remain so to administer the contract. Leadership, technical and facilitative skills are key to undertaking this role. Leadership skills necessary to establish a collaborative team environment include the ability to:

- Establish a vision and motivate others, delegate, inspire and communicate effectively
- Identify, manage and foster healthy and collaborative relationships
- Create an environment of trust and collaboration characterized by the ability to create program/project alliance and build a common purpose
- Guide a facilitative formal partner approach to issue identification and resolution, formulating and maintaining an integrated and cohesive team
- Help the Owner promote and build one team (One Team - One Goal), including laying the groundwork by developing the processes to achieve this
- Guide and create consensus with all the stakeholders (internal and external) on the project definition, intent, design, cost and schedule
- Represent the program/project and its goal to all the parties
- Recognize (and avoid, or disclose and waive) material conflicts of interest
- Carry out duties with integrity and character, recognizing that Owner's Representatives may be required to function in multiple roles
- Integrated project delivery skills including design-build, construction, estimating, Architectural, Engineering, MEP or other discipline design

The experience and education of an Owner’s Representative are essential to direct Designers and Contractors alike. The Owner's Representative must have proven experience that includes an in-depth understanding and knowledge of:

- Required policies, processes and procedures in support of all procurement methodologies

- Local, State, and Federal contractual agreements including in-depth knowledge of different program/ project delivery methodology such as:
 - Program Control Systems, tailoring and implementing program control and reporting systems including but is not limited to: cost estimating; program/project scheduling; cash flow and accrual projections; earned-value analysis; progress reporting systems;
 - Project management information systems, technology and tools
 - Procurement processes including the ability to assist the Owner with selecting the right team, as well as RFQ, RFP and agreement template development
 - Qualifications-based and best value selection processes
- All construction techniques in order to provide pertinent buildability input during initial concept design stage onwards
- Strong capability for design, project cost and schedule review to include:
 - Ability to assist in assuring design submissions meet the intent of the RFP and accepted competitive proposals
 - Confirming that any agreed-upon enhancements and/or deviations are consistent with the contract requirements
 - Practical schedule and methodology knowledge to set initial schedule requirements and interrogate / respond to Contractor's schedule submittals, progress reporting and potential extension of time claims
 - Independent cost estimation skills
 - Understand what value means, how balance sheets and business plans work, funding and investment criteria
- Working knowledge and keen awareness of:
 - Market conditions and practices to promote a competitive field (in-depth knowledge of commodities availability and cost escalation factors, e.g. availability of key trade Contractors and skilled labor)
 - Design and construction industry standards applicable to the project
 - Applicable industry and building codes
 - Environmental restrictions and concerns
 - Market sector specific requirements
 - Risk allocation and management
 - Innovation as an outcome of effective design-build, and the innovative use of best practices to meet Owner's needs

Facilitative skills combined with leadership skills result in a "Facilitative Leader". Among the most critical facilitative skills for an Owner's Representative are the ability to:

- Be able to ask of others and know what you are asking is practical and achievable
- Use active listening skills, including paraphrasing, summarizing, reflecting, and questioning
- Encourage and generate participative discussion in groups

- Stimulate creative thinking through brainstorming/other idea-generation processes
- Stimulate strategic consideration of alternatives and informed decision-making of appropriate choices
- Manage contrasting perspectives
- Lead/design inclusive group processes that honor different learning styles
- Help shape more powerful and strategic questions for exploration

With honed facilitative skills the Owner's Representative will have the ability to guide and facilitate:

- Teambuilding and alignment of Owner's objectives and expectations
- Procurement process
- Agency reviews
- Design and construction execution
- Project closeout processes

From experience, those with an element of Contractor background make suitable Owner's Representatives.

CASE STUDY

The Owner signed a thirty-year lease with the Port Authority to develop and operate a 25-acre container yard adjacent to an operating container yard.

Regular Port Authority standards and guidelines initially made the project business plan unviable but by persuading the Port Authority to accept a reduced infrastructure specification for the site for the tenant's specific use over the concession period, the project became viable.

The design had to be cost driven to support the Owner's business plan. Owing to the adjacent container terminal, boundary interface elevations were to be constrained however that did not stop us challenging this constraint. The site also suffered utility and oil pipeline constraints on the southern boundary. The exact locations of these pipelines were recorded following a number of excavated potholes, to ensure their position did not encroach on to the site or that their depth would affect the construction works at the boundary edge.

In addition to the adjacent to an operational container yard, the Port also had commissioned a new extension to this container yard, the construction of which was ongoing at the start of this project.

Armed with a project construction budget, three bidders were selected on their ability to deliver a project of this size and nature. Two of the three bids were within 1% of each other, both within budget. The selection decision was not made purely on cost, but on the value they brought to the project, their attitude and appetite to deal with risk. The post bid negotiations are where the best Contractor shines and stands out from his competitors. The ability for the successful Contractor to differentiate himself from the others is a skill all Contractors should learn. It is an art, part poker game, part confessional, but as an Owner's Representative, you find out who really wants it and

who you would prefer to work with. Partnering is the key. The lowest and best Contractor was selected.

Without the original cost driven design and the varying of the landlord standard specifications, there wouldn't be a project. Sound decision making made it possible.

Lessons learnt include limiting the bidding Contractors to three proven Contractors ensured the right people for the right job. It should be noted that much early work was needed in researching those suitable contactors. They were selected on their previous track record and proven expertise in the construction systems to be adopted, experience in cost certain delivery mechanism, proven quality workmanship, time line adherence, financial stability, suitable site management personnel, attitude, chemistry and willingness to gel as a team.

For reasons described earlier in this paper a short bid list of Contractors are always our recommendations. Contrary to some other views, limiting the bid list ensures that the bidders are focused and willing to spend time and effort to maximize the commerciality of their offering. Ultimately the Owner benefits from this. Simply put the greater the number of bidders the less the chance a Contractor will see to win so the less the effort to think out of the box and laterally and hence his offer price

A prerequisite for this project's success lay in the quality of the Owner's Requirements. Managing and understanding the Owner's expectations on project completion was critical in the process thus avoiding disappointment to all involved. Agreeing serviceability criteria, maintenance protocols, and serviceable life helped the Contractor's Designers manage a design that fulfilled these expectations.

And so, the right choice of procurement route, design team and Contractor resulted in the project delivered on time, within budget and quality parameters and also benefitted from no work change orders.

CONCLUSION

Design Build is an established method of procurement worldwide, in many sectors of the construction industry. Established standard forms of contract provide a framework and the Owner's Requirements provide the detailed brief to allow the works to be procured, designed and constructed. Good Owner's Requirements protect the Owner's intentions but give the contractor the opportunity to bring their skill to the project and take risk and achieve cost certainty. This model of procurement has been successfully implemented on Port projects in the United States and overseas, and continues to be the favored route for many corporations.

REFERENCES

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