

COMPARING THE PERFORMANCE OF DESIGN-BID-BUILD (DBB) AND DESIGN-BUILD (DB) COMMERCIAL CONSTRUCTION PROJECTS

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The New Zealand commercial construction industry predominantly employs the traditional Design-Bid-Build (DBB) contract process, where design and construction responsibilities are separated. This often results in design errors and omissions, leading to significant cost and schedule overruns. However, the Design-Build (DB) contract process, which integrates design and construction under a single contractor, is gaining traction. In this model, the contractor assumes financial and schedule risks once the client approves the budget. This study employed a multi-case research approach to compare the DBB and DB contract processes. Data were collected from eight projects completed by an Auckland construction company and evaluated against key performance indicators. Additionally, interviews with key stakeholders provided insights into the performance benefits and challenges of each contract process. The findings reveal that stakeholders adhere to familiar contract processes, negatively impacting the industry. The DB process was found to mitigate cost and schedule overruns more effectively than the DBB process. It facilitates early collaboration between the contractor and project team, addressing design errors and buildability issues upfront and ensuring smoother project execution. The DB process is particularly effective for small- to medium-scale, less complex projects, while the DBB process remains suitable for large, complex projects requiring substantial client input during design.

Keywords: Construction contracts, Cost and schedule overruns, Project performance, Stakeholder collaboration, Buildability issues.

1 INTRODUCTION

The New Zealand commercial construction industry predominantly employs the Design-Bid-Build (DBB) contract method, which can negatively impact all project stakeholders (Prentice and Watts 2013). However, alternative contract processes, such as Design-Build (DB), could enhance performance for all involved parties. Improving project performance is crucial for advancing the commercial construction industry and ensuring the full utilization of available expertise. The traditional DBB contract is the most common method for commercial construction projects in which two separate entities handle the design and construction phases, both managed by the client (Park and Kwak 2017). In contrast, the less commonly used DB contract process consolidates design and construction under a single entity, thereby shifting the risk away from the client (Shrestha and Fernane 2017). Each contract process offers distinct performance advantages and disadvantages for stakeholders.

This research aims to provide a comprehensive understanding of the current contract processes used in New Zealand, the motivations behind their use, and the advantages and challenges observed

in completed projects. The main research question of this study is, “How does the use of DBB or DB contract processes affect the outcome of commercial construction projects in Auckland?”. The three sub-questions examine how the DBB and DB contract methods are currently employed on commercial construction projects in Auckland, the main drivers for stakeholders to use them, and the key advantages and challenges of each contract process. This paper contributes to the discourse on the use of various procurement methods in construction by conducting a comparative analysis of the two processes. The study seeks to inform project stakeholders, such as clients and contractors, about the actual performance of each method. The findings are intended to give stakeholders confidence in selecting the most appropriate contract process for their future commercial construction projects.

2 RESEARCH APPROACH AND METHODS

The study adopted an exploratory multi-case study method, analyzing eight completed commercial projects (four DBB and four DB) in Auckland, all delivered by a single main contractor to minimize variability. Focusing on car yard and warehouse projects, the matched project types enabled a comparative assessment of DBB and DB contract processes. Furthermore, the data offered insights into the company's project outcomes, assisting in forming comparative conclusions about the DBB and DB contract processes, identifying areas for improvement, aiding discussions, and guiding stakeholders on which contract process to use and when.

The research draws on diverse data sources, including public records, company documents, and interviews. The project data, both quantitative and qualitative, included the final progress claims indicating the contract and variation values, the tender and final programs highlighting program changes, and floor plans to compare the project scope. The five selected interviewees included two contractor representatives, two clients, and one client representative, all of whom have been in the industry for 15 to 50 years. Most of the selected interviewees were involved in multiple projects, providing a greater depth of data from a smaller pool of people.

3 FINDINGS

3.1 Contract Processes Currently Utilized on Commercial Construction Projects

Industry reports suggest that the DBB contract process is the most used method for small to medium commercial projects in New Zealand (Van Houtte and Cheetham 2023). This view is supported by the study's interview data, which confirmed that DBB is a primary contract process. In contrast, the DB process was identified as more prevalent in specific scenarios, such as bespoke buildings or land and home packages. Notably, clients utilizing DB contracts, particularly for warehouse projects, tend to engage trusted contractors rather than seeking open tenders. This exclusivity limits DB's market share and emphasizes the importance of strong relationships in securing DB projects. As the interviewees observed, DB opportunities arise primarily due to successful prior collaborations, though there are indications of a gradual shift toward DB. The industry's reliance on DBB reflects a broader challenge: adherence to traditional procurement practices that stifle innovation. Industry research on procurement methodology in New Zealand (Prentice and Watts 2013) argues that such approaches, characterized by adversarial behavior and limited value perspectives, hinder the industry's ability to fully exploit its potential. Although four out of five interviewees expressed a preference for the DB process, contractors noted significant barriers, including a lack of trust from clients, who often view DB's contingency allocation skeptically. These findings suggest a growing interest in alternative procurement methods like DB but

emphasize the need to address trust and collaboration barriers to enable wider adoption and improved project outcomes.

3.2 Drivers for Contract Process Selection for Stakeholders

When selecting a contract process for a construction project, it is crucial to assess the project’s key performance indicators (KPIs) to identify the most suitable approach. Clients should prioritize and weigh the following factors based on the specific needs and goals of the project: the speed of project delivery, single point of responsibility, cost certainty and accountability, broader/priority outcomes, design quality, complexity, flexibility to change, and the certainty of scope (MBIE 2019). However, the interview data indicate that stakeholders tend to rely on familiar processes, with standard selection criteria primarily emphasizing relationships and project complexities. Contractors are more likely to be driven to undertake a DB project if the scope is not too complex, and turn away complex DB projects. In contrast, a client consultant mentioned their reliance on contractors for the complexities experienced on projects. This contrast shows a disconnect between contractors and clients within the current industry. The MBIE (2019) guidelines favor the contractors’ point of view, noting that complex projects are less suited to DB as the contractor usually always selects final products and specifications, making complex items harder for clients’ input.

3.3 Advantages and Challenges Associated with the DBB and DB Contract Method

Analysis of the eight case study projects showed that average program growth from the tender stage to completion was 7.16% for DBB and 2.31% for DB projects, with DB projects experiencing fewer delays but no program savings. DB contracts allow earlier contractor involvement, improving coordination and managing design-related delays more effectively (Van Houtte and Cheetham 2023). Cost growth, measured from the initial contract value to the completed project value, averaged 10.99% for DBB versus 3.26% for DB - a 7.73% difference, highlighting DB's cost certainty (MBIE 2019), despite higher upfront pricing due to risk allowances. Interviews noted additional DB benefits, including improved collaboration and contractor input in design, enabling better cost control.

However, DB projects face challenges: higher initial costs, pricing issues, and risk transfer to contractors, particularly for design accuracy. Contractors must carefully assess documentation early to manage risk and avoid financial exposure. Table 1 summarizes some of the key findings.

Table 1. Key factors influencing procurement method selection in construction projects.

Factor	Design-Bid-Build (DBB)	Design-Build (DB)
1. Project Complexities	Better suited for straightforward or well-defined projects.	Better for complex or fast-tracked projects needing integration.
2. Cost Certainty / Program Growth	High-cost certainty before construction, but risks of growth if design issues arise.	Early cost input, but potential for scope creep if not managed well.
3. Control of Consultants	Client retains direct control over design consultants.	Contractor manages design team; less client control.
4. Risk Profile	Client bears more design-related risks.	Greater risk transferred to contractor.
5. Relationships / Team Collaboration	Formal and structured relationships with clear contractual boundaries. Design and construction are separate.	Integrated team approach encourages collaboration.

4 DISCUSSIONS

4.1 Current Contract Processes in Use

The study's findings reveal that the most used contract process in New Zealand's commercial construction industry is the DBB contract. This process is predominantly employed in small to medium commercial projects, whereas the DB process is more frequently utilized for land and home packages. These local trends align with international ones; DBB is the most widely used contract type across various construction projects worldwide (Rostiyanti *et al.* 2019). However, the widespread reliance on the DBB contract process is believed to negatively impact the construction industry. Many projects still adhere to this traditional procurement approach, which research suggests may lead to inefficiencies. The client-driven preference for the DBB process often results in frequent change orders and claims (Park and Kwak 2017). Additionally, clients appear to exclude skilled DB contractors, relying instead on their past experiences with contract selection. Although the interviewees expressed a preference for the DB contract process, they noted that DBB contracts remain predominant in their current roles, which indicates a latent desire within the industry to adopt the DB process more frequently. Securing DB contracts can be difficult, as these projects often depend on pre-existing client-contractor relationships, making it hard for new contractors to compete for such opportunities. The narrow approach of clients to consider mostly cost certainty and project complexity may adversely affect project performance, limiting opportunities for improved efficiency and innovation within the sector.

4.1.1 DBB contract process performance

The data from the eight case studies highlighted several advantages of the DBB process, including reduced risks for contractors, enhanced client control, and more competitive pricing. Design errors, omissions, or changes can all be claimed as variations or time extensions, shielding the contractor from potential liabilities and, at the same time, shifting considerable risk onto the client. If not managed effectively, clients may incur additional costs for unnecessary work resulting from design errors, ultimately impacting the overall project budget and timeline. Clients prefer the DBB model as it provides greater control over the detailed components of the construction process and ease of design changes as needed, without the need to navigate through contractors and separate design teams. It is crucial for clients to carefully evaluate tender submissions, as the lowest bid may come from a less reputable contractor or one who has underestimated the project scope, potentially leading to significant project issues (Almuhannadi and Ghareeb 2024). However, the process also presents notable challenges, particularly in managing cost escalation and schedule growth. On average, DBB projects experience significantly higher cost and program growth compared to DB projects due to design errors, omissions in drawings, poor material selections, and buildability issues, all of which can disrupt the project and negatively impact stakeholders. Similarly, the literature suggests that the DBB process often leads to fragmentation, miscommunication, and coordination problems, causing delays and cost overruns, straining relationships among stakeholders, and often leading to disputes (Almuhannadi and Ghareeb 2024). These challenges drive clients and contractors to explore alternative contract processes (Lee *et al.* 2020). The shift away from DBB reflects a growing recognition of the need for more collaborative and integrated approaches to mitigate the risks and inefficiencies inherent in the DBB model.

4.1.2 *DB contract process performance*

The DB process provided higher cost certainty and cost performance, shorter program durations, greater collaboration, and improved buildability. These findings concur with the literature, which reports that DBB projects use 22.8% more contract days than DB projects on average (Park and Kwak 2017). Managing program growth and shortening construction durations is a critical performance advantage for clients (Chen *et al.* 2016). The cost performance of the DB contract process was significantly superior across the eight projects analyzed. On average, cost growth for DB projects is 3.8%, compared to 7.4% for DBB projects (Shrestha and Fernane 2017). The effectiveness of a DB contract process depends on the project's type and scope when implemented successfully (Chen *et al.* 2016). The DB process in this research provided further qualitative advantages to all stakeholders, such as increased team collaboration and the use of shared knowledge. Clients, contractors, and consultants prefer the DB process due to its increased collaboration and enhanced knowledge sharing among team members (Lee *et al.* 2020). The common challenges of the DB contract process include increased financial risk for the contractor, reduced client control, and lower pricing competitiveness. Financial risk is a critical focus area for contractors before they engage in DB contracts (Rostiyanti *et al.* 2019). The client's lack of control over the project's outcome, possibly leading to additional variations and delays, is a common theme in the literature (Park and Kwak 2017). The lack of pricing competition often results in higher tender costs for the client. This occurs because the client negotiates with a single contractor, making it more difficult to obtain competitive bids, unlike in the DBB process.

4.2 **Implementing New Contract Processes for Better-Performing Projects**

When comparing the DBB and DB contract processes, the DB approach demonstrates a clear performance advantage when implemented correctly. To maximize project success, stakeholders must invest more time in pre-construction planning and carefully consider the most suitable contract process based on their specific project requirements and desired outcomes. However, the DB process is not universally ideal. Smaller projects or those with highly specific client requirements may still benefit from the DBB approach, as it allows clients to maintain the necessary level of control for successful project completion.

For stakeholders choosing to implement the DB contract process, several key considerations must be addressed to ensure a successful outcome. Inexperienced clients often select unqualified or unreliable contractors, leading to project failures. To mitigate this risk, clients must dedicate sufficient time to thoroughly evaluate contractors' qualifications, track records, and proposed service offerings. Establishing a structured contractor selection process - focusing on key cost factors, contract rates, and non-priced attributes can help clients make informed comparisons between potential contractors (Park and Kwak 2017). For contractors offering DB contract services, it is crucial to fully understand the risks involved. They must ensure that their internal project management teams and design professionals possess the necessary expertise to minimize design errors and effectively oversee project execution. Key client expectations for contractors include strong project management capabilities and effective communication strategies. Contractors must prioritize these aspects when implementing the DB contract process to enhance project outcomes and maintain client satisfaction.

5 CONCLUSIONS

To advance the New Zealand commercial construction industry, clients and contractors must be open to exploring and adopting more efficient contract processes. Fully leveraging the industry's potential will lead to improved project performance and long-term benefits for all stakeholders.

When considering a transition to the DB process, it is essential to evaluate the project's nature and complexity. Successful DB implementation requires thorough contractor selection, risk management, and a skilled project team. Adopting best practices in contract delivery can enhance project outcomes and benefit all stakeholders.

This study examined eight projects of similar scope, which, while ensuring consistency, may limit the generalizability of the findings. Including a broader range of project types (e.g., schools, supermarkets, healthcare) could have revealed sector-specific trends in procurement method performance. The interview sample was limited to five participants due to availability and existing networks. A wider survey may have provided further insights. Nonetheless, alignment between interview data, industry sources, and international literature supports the validity of the findings.

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