BUILDING PROCUREMENT BY DESIGN AND BUILD APPROACH

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ABSTRACT: As a method of procuring buildings, the design and build approach accounts for an increasing proportion of building construction output in the United Kingdom. This paper reports a survey of contractors, designers, and building clients regarding design and build issues. These issues include the circumstances in which the approach would be suitable, the project organizations commonly employed on design and build projects, the difficulties commonly encountered by practitioners, and the attitudes of the construction professionals to the procurement route. The main findings of the research are as follows: (1) The use of design and build is on the increase with many clients perceiving it as providing better value for money and giving rise to less disputes than other procurement methods; (2) the approach can be used satisfactorily with most sizes of projects provided the client is experienced; (3) although more and more of the construction professionals accept the approach, there is still considerable resistance to its use; (4) the few disputes encountered have concerned abortive work, inaccuracies in the client's brief, conflict between the brief and the contractor's proposal, and valuation of variations; and (5) a clear brief is the most important prerequisite for success.

INTRODUCTION

For much of this century the procurement of construction work has predominantly followed the so-called traditional approach. This approach entails the client engaging separate organizations for three key services: design, cost advice, and construction. By and large, the contractor is not appointed until the project is completely detailed in accordance with the design of the architect and the cost advice of the quantity surveyor. The professionals involved are educated on professionally isolated courses and, in the practice of their professions, belong to separate professional institutions. Relations among these institutions can at best be described as lukewarm and often border on mutual suspicion and contempt.

Many readers of this journal may not understand the role played by the quantity surveyor, because it is unique to the construction industries in the United Kingdom and some of its former colonies. It is therefore briefly explained. At the early stages of the project procurement cycle, the quantity surveyor provides three main services, the first of which is the production of cost estimates for the decision making of the owner and designers. At this stage the information upon which the estimates are produced are no more than floor areas of the desired accommodation and outline dimensions of the buildings. To the owner the estimates are very useful for budgetary and financial control purposes, while to designers they allow an interactive examination of the cost implications of their design decisions. The second type of service at the preconstruction stage consists of advice to the owner

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regarding the project, for example about contract strategy, taxation, and model conditions to be used. Third, the quantity surveyor normally prepares most contract documents for the engagement of contractors, suppliers, and subcontractors. The quantity surveyor's role during construction changes to one of financial administration on the owner's behalf. For example, the quantity surveyor assesses interim payments, negotiates subcontracts and supply contracts, prices and negotiates variations (changes orders), assesses claims, and determines final accounts.

This fragmentation of the construction process has been criticized by reports ("The Placing" 1964; "Survey" 1962; Higgin and Jessop 1963) from various national bodies set up in the 1960s to examine the workings of the construction industry and to make appropriate recommendations. Although the findings were accepted, by and large there has been very little effective remedial action. Over the last fifteen years, however, there has been proliferation of alternative procurement methods such as management contracting, construction management, and design and build. Various surveys ("Design" 1989, "Design" 1990, "Design" 1991, "Design" 1986; *Report* 1989; "Contracts" 1986a; "Contracts" 1986b; "Contracts" 1989; "Contracts 1991"), if read together, indicate that the design and build approach has been by far the most popular of these alternative procedures, with its share of construction output consistently exceeding the combined share of the others.

This paper hypothesizes that certain features of the design and build concept account for its popularity. Unfortunately, this increase in interest has not been accompanied by a commensurate understanding of these features across the construction industry. To redress this problem, a postal survey of contractors, building clients, and architects was carried out. The objective of the survey was to obtain feedback on the following aspects of the approach:

- The type of project and client for which the approach is most suitable
- Forms of contract used
- Attitudes of the professions
- Client representation
- The advantage of single point responsibility
- Quality of design and constructability
- Time, cost, quality
- Legal disputes
- Common areas of concern
- Its future

The research concentrated on three categories of respondents: contractors, clients, and architects. Two hundred organizations were contacted. Of these, 74 responded. Further and detailed interviews were then conducted with 11 leading organizations.

Two observations from the responses were of particular interest. First, most of the respondents are leading organizations in the construction industry, with a considerable number operating multinationally. Second, they were completed by very senior management in the organizations, mainly directors and partners. The survey therefore captured the interest of people working at the heart of the industry, a fact that makes the views expressed more noteworthy.

Unless indicated otherwise, numbers against any category of respondent are percentages of that category.

DESIGN AND BUILD PROCEDURE IN OUTLINE

The term "design and build" as used in this paper refers to the procurement strategy that entails the contractor carrying out and being responsible for not only construction but also the design of the works. Once a client decides on this procurement route, he or she needs to prepare a clear statement of exactly what he or she wants and of the constraints within which the building is to be provided. This statement is generally referred to as "the client's brief." However, when incorporated as a contract document into design and build contracts, most standard conditions of contract use the term "Employer's Requirements." The reason for this alternative terminology is that the client is referred to as the "Employer" in most standard contracts. The document can vary from a general statement of the client's needs to a detailed schedule of his requirements incorporating outline drawings and specifications. A list of contractors of established skill, integrity, responsibility, and proven competence in the execution of similar projects is compiled. The Employer's Requirements together with all necessary information are sent to each contractor selected to tender.

Each tenderer then prepares proposals for meeting the Employer's Requirements. The document containing the proposals is referred to formally as the Contractor's Proposals, and will normally contain drawings, specifications, design criteria and calculations, and an analysis of the contract price. The client, or advisers on his or her behalf, evaluates the proposals of each tenderer and identifies the most advantageous tender. When the tender is of the single-stage category, a contract is executed at this point. In many cases, however, the employer may wish to have the opportunity to negotiate prices or design changes with the successful tenderer. In such a situation the tender is said to be of the two-stage category. The procedures described also apply to this type of tender. In this case the contract is executed only on completion of the second stage, during which the client and the contractor negotiate the details of their contract.

TYPE OF PROJECT AND CLIENT

For a long time there was a school of thought, the "garden shed" school, that considered design and build suitable only for very simple structures such as garden sheds. Some, while not so dismissive of design and build, maintain that the procurement system is suitable for only projects not exceeding £5,000,000 (Swan 1987). Furthermore, according to a report from Centre for Construction Market Information (*Report* 1989), there is a significant body of opinion among some architects and clients that subscribes to this view. The same report, however, estimated that at least 10% of design and build projects in 1989 were over £5,000,000 in value. Indeed, 24 projects were of value in the range of £10,000,000–50,000,000; and only four were between £50,000,000–300,000,000.

One question in the survey sought to obtain the view of the industry on this garden shed image; 98% of contractors strongly disagreed with the image. There was initial temptation on the part of the writers to dismiss this reaction on the ground that considering possible vested interests of the contractors, it was to be expected. Most of the respondents submitted lists, photographs, and other details of large and complex buildings they had

executed under design and build contracts. These projects included television (TV) studios, superstores, hospitals, football stadia, pharmaceutical factories, nuclear power stations, sewage treatment works, dock quays, leisure centers, high-technology buildings, and a laundry for radioactive clothing. Interestingly, all clients who responded disagreed with the image. The number of architects who disagreed was 38%, while 25% agreed, with the rest not expressing any opinion. Considering that to the vast proportion of architects the design and build concept had once been absolute heresy, there can be little doubt that the fortunes of design and build have improved.

It has been suggested that for an unsophisticated client, one who does not possess any knowledge of the workings of the construction industry, the design and build route may not be advisable. It would appear that most of our respondents shared this view. One question asked them to indicate, on a scale of 1 to 5 (1 for totally naive, 5 for very sophisticated), the level of sophistication of the client for which the approach would be suitable. The average score was 3. Again and again, the comments referred to the paramount importance of the brief and the difficulties that can arise when the client is not experienced enough to produce a brief that is clear and comprehensive.

FORMS OF CONTRACTS

For a long time, most of the standard forms of contract for design and build were the in-house contracts of the construction companies that operated in this area. Some used the standard forms for traditional contracts amended for the design and build situation. For two reasons neither of these options appealed to clients. First, the in-house forms were blatantly biased toward the interests of the contractor. Second, amendments of the traditional forms too often ended up assigning muddled responsibilities. According to Janssens (1991), a director of the design and build division of Tarmac Construction, the use of these contracts was a factor in the resistance of clients and their advisers to the design and build concept.

In 1970 the National Federation of Building Trades Employers (now the Building Employers Confederation), a body representing building contractors, produced a standard form, but it failed to get established. It was not until 1981 that, at the invitation of the Department of the Environment, the Joint Contracts Tribunal (JCT), a body consisting of representatives of all interest groups in construction, produced the Standard Form of Building Contract with Contractors Design, 1981 edition (the JCT81). This contract is intended for use when the whole design is to be carried out by the contractor. For situations where the contractor is to contribute only a part of the design, the JCT also produced a Contractor's Designed Portion Supplement to their existing Standard Form of Building Contract (the JCT80). Forms from the Association of Consultant Architects (ACA), the British Property Federation (BPF), and the Property Services Agency (PSA) also now allow for part of the design to be carried out by the contractor.

The ACA was very dissatisfied with the JCT80 when it was first produced. The main cause of the dissatisfaction was a perception by most of its members that the form was too biased in favor of the contractor and to the detriment of the building client. In response the ACA produced the ACA Form of Building Agreement, in which it attempted to provide for a more equitable allocation of risk.

The BPF is a body representing commercial organizations with substantial property portfolios. They include property development companies, super-

TABLE 1. Extent of Use of Various Standard Forms

Standard form (1)	% of all respondents (2)
JCT81	89
JCT80 with contractor's designed portion supplement	5
Contractor's in-house standard form	2
Other	3

market and other retail chains, high street banks, and other investment companies. As a group, they account for over 60% of private construction output. In 1983 the BPF produced a new procurement system for use by its members (*Manual* 1983). This step was taken as a result of long-standing dissatisfaction with the existing procurement systems. An outstanding feature of this new system was that it provided for the contractor to carry out and be responsible for detail design on projects procured by the method. In 1984 the ACA and BPF jointly produced the BPF/ACA Form of Building Agreement for use with the new system.

The PSA is the construction procurement department of central government. Its form of contract, the General Conditions for works of Building and Civil Engineering (GC/Works/1) allows for the contractor to carry some design responsibility. This form is used in most government construction work. However, because it provides for a firmer control of the contractor than any other existing standard form, some private clients and local government organizations also use it.

One part of the questionnaire required respondents to indicate which of the forms they most commonly used or worked to. Their responses are summarized in Table 1.

The responses highlight the popularity of the JCT81. In recognition of this popularity the JCT and the BPF published in 1988 supplementary provisions to the JCT81 that allow it to be used with the BPF procurement system.

ATTITUDES OF PROFESSIONS

The attitude of the professions to the design and build concept has been hostile. This hostility may be seen as part of the low esteem in which the builder was regarded by the professions. It was therefore seen as a compromise of professional standards to be employed by a builder. Until fairly recently the code of conduct of the Royal Institution of Chartered Surveyors (RICS), a body representing quantity surveyors, prohibited its members from taking up employment in a contracting organization. This accounted for the existence up to the 1980s of two parallel professional organizations for quantity surveyors, the Institute of Quantity Surveyors (IQS), for those working for contractors, and the RICS, for those firms offering only professional services. Although the Royal Institute of British Architects (RIBA), the body representing architects, did not prohibit employment in contracting organizations, it was against their code to become a director in a contracting organization.

Attitudes have changed significantly. The professional bodies have abolished the restrictions on the movement of their members in the industry. This change is attributable to a number of causes. First, the standing of the builder among project participants has improved tremendously. No longer

TABLE 2. Respondents' Perceptions of Resistance from the Professions

Respondents (1)	Resistance from Architects			Resistance from Quantity Surveyors		
	Very strong (2)	Strong (3)	None (4)	Very strong (5)	Strong (6)	None (7)
Contractors	16	82	2	13	65	22
Clients	44	56	0	0	89	11
Architects	25	74	1	10	68	22

is the builder seen as a party who has to be told in minute detail what he or she must do and be supervised closely to prevent his or her cutting corners. Second, the private sector has replaced the taxpayer as the major client of the construction industry. It is therefore to be expected that the private sector would subject the procurement of their buildings to the same scrutiny as the rest of their businesses. As already mentioned in connection with the BPF, some private sector clients have come to the realization that the traditional approach does not necessarily provide them with the best value for their money. Third, cyclical falls in the workload of the professions have dictated a change.

Another section of the questionnaire sought a general insight into the extent of the change of attitude. Table 2 contains the feedback the respondents provided when they were asked to indicate, on a scale of "very strong," "strong," and "none," their experience of resistance from architects and quantity surveyors.

It would appear from these figures that there is still considerable resistance to the design and build approach. It is of some interest to note that some design and build contractors said that they always subcontract design to external consultants for no other reason than the need to avoid upsetting the professions. Details of feedback on this issue are provided in other parts of the paper.

On the question of fees, there were many comments about the professional fees paid to consultants in respect to their services on design and build contracts. There was a general consensus that fees were much lower than those involved with the traditional approach. At a conference attended by the second writer, a past president of the RIBA and chairman of a leading firm of architects said that his firm had taken fee reductions of 18–35% on design and build projects. He added that his firm had lost jobs to other reputable firms that had abated their fee scales by over 50%.

Contractors, although acknowledging the resistance from the professions, commented that many professional firms were gradually coming around to the method. Many expressed the view that the professions were still at the early stages of the learning curve and that other contractors will find the faster turnaround of fees and the reduction in responsibility for the management of projects a considerable attraction.

ADVANTAGE OF SINGLE-POINT RESPONSIBILITY

A much-vaunted advantage of the design and build approach is that the employer has only one party to deal with: the contractor. In the traditional systems the client is often in contract with designers (architects, structural engineers, electrical services, mechanical services), the quantity surveyor, and nominated subcontractors. The responses to the question of whether

TABLE 3. Perceptions of Value of Single-Point Responsibility

Respondents (1)	Advantage (2)	No advantage (3)	Don't know (4)
Contractors	85	15	0
Clients	11	89	0
Architects	63	25	12

TABLE 4. Perceptions of Cost Savings from Constructability

Respondent (1)	Very high (2)	High (3)	Marginal (4)	None (5)
Contractors	25	62	13	0
Clients	0	56	44	0
Architects	0	50	50	0

the single responsibility always works to the advantage of the client are shown in Table 3.

The response of the clients was surprising. Fortunately, they provided detailed comments on this issue. It was a general comment that the extent to which the client reaped the potential benefits depended on the clarity and concise nature of his brief. One influential client commented that where there is any element of doubt in the brief, there is always the temptation on the part of the contractor to push the client down routes that the client did not intend to take.

CONSTRUCTABILITY

It is often said that in the traditional approach designers do not consider the ease with which the contractor can construct to their designs. Many contractors argue that in most cases the designer does not possess adequate practical experience of on-site construction to appraise designs as to constructability. The logical conclusion to this line of thinking is that the client can actually save himself some money by having a contractor communicating with the designer at the very beginning of the design process.

It is estimated that with the traditional approach the designer, through his design decisions, commits the client to about 80% of the project costs by the time the contractor is appointed. It is very difficult to fault this argument. It was therefore decided to consult the industry on this issue. Respondents were asked to indicate, on a scale of "very high," "high," "marginal," and "none," the potential for cost reduction to the client through constructability. The responses are shown in Table 4.

It is noteworthy that over 50% of all respondents, including architects, believe that the design and build approach can lead to high reduction in costs through improved constructability of design.

AESTHETICS

Conventional thinking has it that in the pursuit of constructability contractors almost always sacrifice design quality, leading to bland and unimaginative buildings. Ninety-eight percent of contractors disagreed with this notion. Of architects, 25% subscribed to this view while 38% disagreed. The rest declined to express any opinion. Interestingly, all clients disagreed

TABLE 5. Perceptions of Design Compromise

Respondents (1)	Always (2)	Sometimes (3)	Never (4)
Contractors	0	60	40
Clients	0	89	11
Architects	22	66	12

that design and build leads to bland buildings. Some clients commented that in most cases they are not looking for buildings that will win architectural awards. One client went to the extent of saying that with the traditional system the exercise by the architect of unreined design flair has sometimes resulted in buildings that are too complex and very expensive to maintain (typically through inadequate provision for access to parts of the building). A recurring comment was that the client invariably gets what he asked for in his brief.

Responses to the question about whether the contractor's drive for constructability compromises the quality of design are shown in Table 5. It would therefore appear that most clients are satisfied with the quality of design.

TIME, COST, AND QUALITY

Previous studies (Griffith 1989; *Faster* 1983; Pain and Bennett 1988) have indicated that design and build results in shorter total project duration than with the traditional approach. An overwhelming majority of respondents (all contractors and clients and 88% of architects) indicated that design and build is generally faster than the traditional method. Two main reasons were given for the difference. First, buying, and appointment of subcontractors and construction can overlap design. Second, in the drawing up of specifications, the contractor has a superior knowledge of the state of the industry in terms of lead times of key items of materials and components, and will usually arrange his affairs to minimize delay in their procurement.

Some proponents of design and build argue that design and build is cheaper because of better constructability and earlier completion. Pain and Bennett (1988) concluded from case studies that cost may be the same as with the traditional method and may even be lower. The design and build approach is amenable to the stipulation of a maximum guaranteed price. For a client with an overriding concern on costs, the design and build approach provides better protection than the traditional system.

There is no apparent reason for the quality of construction in design and build to be lower than with the traditional approach.

It is the belief of the writers that comparison of costs and quality in absolute terms is not practicable, and that a more appropriate approach is to compare the client's satisfaction with cost and quality at the end of the project. The responses on perceptions of clients' satisfaction are summarized in Table 6 (1 for low; 5 for very high).

If client satisfaction index (CSI) is defined as

$$\text{CSI} = \sum_{i=1}^{i=5} p_i \cdot L_i \tag{1}$$

where L_i = ith level of satisfaction; and P_i = percentage of respondents

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TABLE 6. Perceptions of Clients' Satisfaction (% of Respondents)

Respondents (1)	Satisfaction with Costs 1 (2)	2 (3)	3 (4)	4 (5)	5 (6)	Satisfaction with Time 1 (7)	2 (8)	3 (9)	4 (10)	5 (11)	Satisfaction with Quality 1 (12)	2 (13)	3 (14)	4 (15)	5 (16)
Contractors	0	4	12	52	32	0	0	12	48	40	0	0	31	59	9
Clients	0	0	44	44	11	0	0	33	67	0	0	0	67	33	0
Architects	0	0	25	50	25	0	0	43	28	29	0	10	30	40	20

TABLE 7. Indices of Perceptions of Clients' Satisfaction

Respondents (1)	Cost (2)	Time (3)	Quality (4)
Contractors	4.12	4.25	3.74
Clients	3.63	3.67	3.32
Architects	4.00	3.86	3.70
All respondents	3.92	3.93	3.59

with perceptions at that level, then the indices representing the overall respondents' perceptions of client satisfaction are as shown in Table 7.

The figures indicate that all classes of respondents have high perceptions of the satisfaction of clients with cost, time, and quality. It would appear, however, that the perceptions of contractors and architects are slightly exaggerated. It would also appear that the design and build approach is most suitable where the client's priorities are in the order of time, cost, and quality.

CLIENT REPRESENTATION

The client will require a representative to perform tasks on his behalf such as studying feasibility, obtaining consents from regulatory bodies, drawing up of the formal brief, preparing concept design and outline specifications, and administering at the construction stage. It was attempted to determine the practice regarding the type of individual or organization usually retained to perform these tasks. The responses were as follows: 41% for quantity surveyors, 21% for project management consultants, and 27% for client-appointed employees. Since most project management consultants in building are quantity surveyors, it would appear that of the professions, quantity surveyors are most commonly retained either to advise the client or carry out tasks on their behalf.

DISPUTES

It is a popular belief that design and build construction involves less risk of litigation or arbitration proceedings because the contractor is responsible for all matters of design and construction, including matters regarding fitness for purpose. The proposition received the agreement of the majority of the respondents (79% of contractors, 89% of clients, and 86% of architects). However, many qualified their answers with comments on factors upon which the reduction in disputes depended. They included the clarity of the client's brief and the contractor's proposals, the use of unamended standard

forms, the stipulation of a maximum guaranteed price, and the avoidance of variations.

The followng were identified as common areas of dispute:

- Entitlement of the contractor to payment for abortive tendering
- Conflicting information in the Employer's Requirements
- Work shown on the Contractor's drawings but different from the description in his specification
- Work described in the specification or shown on drawings conflicting with the Employer's Requirements
- Work not shown on drawings, or specification, or detailed in the Employer's Requirements
- Whether the contractor is obliged to carry out everything shown on his drawings
- Valuation of variations including design work

COMMON AREAS OF CONCERN

The only serious concerns expressed were about design liability and related insurance matters.

A designer owes his client a duty to exercise reasonable skill and care in the performance of his professional duties even if the contract for the design service is silent on the point. This is because in English law it is normally implied that every person who enters into a learned profession undertakes to bring to the exercise of that profession a reasonable degree of skill and care. This has now been codified by section 13 of the Supply of Goods and Services Act 1982, which provides that where the supplier of a service is acting in the course of a business, there is an implied term that the service will be carried out with reasonable skill and care.

Most contracts of engagement of designers in construction expressly state that the designer will perform his professional duties with reasonable skill and care. For example, Clause 5.1 of the Association of Consulting Engineers' Conditions of Engagement states, "The Consulting Engineer shall exercise all reasonable skill, care and diligence in the discharge of his duties agreed to by him." Clause 3.1 of the Architect's Appointment which is used to engage architects states, "the Architect will exercise reasonable skill and care in conformity with the normal standards of the architect's profession."

The question of whether a designer has used reasonable skill and care is one of fact. In deciding this question the approach normally adopted by the courts is to seek out what an ordinary competent person belonging to the same profession would have done in the particular circumstances, and to compare it with the actions of the designer in question. Evidence that the defendant followed the normal practices of the profession will usually be enough evidence of the exercise of a proper level of skill and care. If it is found that the designer has applied reasonable skill and care, the designer will not be liable to his client for breach of contract even if the design is not fit for the purpose of the client. However, if the client made his purpose known to the designer prior to his engagement, there would be an implied duty that the design will be fit for that purpose.

The implied duty applicable to a contractor working under a design and build contract is not just one of exercising reasonable skill and care, however, but one of strict obligation in respect of fitness for purpose. That is, it is no defense that the contractor exercised reasonable skill and care if the

TABLE 8. Future of Design and Build

Respondents (1)	Increase a lot (2)	Increase slightly (3)	Remain the same (4)	Decrease (5)
Contractors	70	24	4	2
Clients	56	33	11	0
Architects	75	13	0	12

design is not fit for the purpose of the client. This is a much more onerous obligation than that applicable to a designer providing only design services. Some conditions of contract contain express terms that purport to reduce the higher duty implied by the law to that of a designer offering only design services, a duty of exercising reasonable skill and care. The effect of such provisions is not without some doubt. This is because, as noted in the Unfair Contract Terms Act 1977, terms excluding or limiting liability in contract may be void unless they are reasonable.

Designers have usually protected themselves against liability for breach of their duty to exercise reasonable skill and care by taking out appropriate professional indemnity insurance coverage. The insurance market has provided this type of coverage for a long time and is therefore able to quantify the risk involved.

A design and build contractor takes onboard responsibility for design, and will be liable for design faults. It follows that he must have the protection of insurance coverage equivalent, at the very least, to that of a design consultant. This requirement has given rise to several concerns. First, it was commented that the smaller and less experienced design and build contractors, most of whom started in traditional contracting, do not have adequate understanding of the design liability situation and insurance implications of the design and build approach. Second, it would appear that many contractors fail to insure against their design liability. Indeed, the JCT81 does not require contractors to take out this insurance. Third, the insurance industry has very limited experience in providing coverage to contractors against liability for design. This has meant that the pool of underwriters is very small, leading to high premiums. Coverage against liability for fitness for purpose is virtually unavailable.

FUTURE OF DESIGN AND BUILD

The earlier surveys indicate that in 1989 the design and build share of the U.K. construction industry was between 15% and 25%. An even more interesting indication of all these surveys is that since 1985 there has been a rapid growth in the use of this procurement method. It would appear from the figures that the design and build method's proportion of construction will consistently increase into the 21st century.

On the question of the future trend in the use of the method, the views of our respondents are shown in Table 8. The figures suggest that most clients, architects, and contractors are of the opinion that the design and build procurement will increase in popularity.

CONCLUSIONS

The main findings of the survey are as follows.

The use of design and build is on the increase, with the majority of "client"

and "contractor" respondents welcoming this development. Clients perceive it as providing better value for money, particularly where time for completion is of essence. However, there are concerns regarding design liability and related insurance matters.

The view that the design and build procurement method is only suitable for very small and simple projects is no longer tenable. The method has been used successfully on large and complex projects. Size and complexity present problems only where there are inadequacies in the client's brief. This suggests that, in those circumstances, the method may not be suitable for the novice client. Such a client would need not only professional advice, but also some education on the importance of his brief.

Although the professions have changed their attitudes toward the method, there is still lingering hostility, particularly from architects. It would appear that some of them are still of the opinion that design and build produces buildings of indifferent aesthetic appeal. To get around this problem, most design and build contractors engage external design consultants.

The most popular standard form of contract for design and build is the JCT81.

The main advantages claimed for the method relate to constructability, time, cost, and reduction of disputes. Although respondents acknowledged the advantage of single-point responsibility, they also cautioned that it does not always work to the advantage of the client. It was pointed out that where a client is not sure of what he wants there is sometimes a tendency to push him down routes that may not be in his best interests.

The few disputes encountered have usually concerned payment for abortive work, inaccuracies and conflicts in the client's brief, inaccuracies and conflicts in the contractor's proposals, and valuation of variations.

ACKNOWLEDGMENT

The writers would like to thank the responding organizations (listed in Appendix I) for the generosity with their time in responding to our questionnaire and/or granting us interviews. It is to be noted that as a result of the recession in the U.K. economy a few of the respondents may have gone out of business since the survey.

APPENDIX I. LIST OF RESPONDENTS

Alfred McAlpine Construction Ltd.
Allen-Fox Construction Ltd.
Arnold and Nathan Ltd.
Austion Company (UK) Ltd.
Balfour Beatty Building (Southern Region) Ltd.
Birse Construction Ltd.
Bovis Construction Ltd.
Carter R. G. Projects Ltd.
Clugston Construction Ltd.
Conder Projects Ltd.
Dean and Dyball Construction Ltd.
R M Douglas Construction Ltd.
J A Elliot Ltd.
Eve Construction Ltd.
Faircloough Building (London & Southern) Ltd.
Galliford Midlands Ltd.

M J Gleeson
Haymills Contractors Ltd.
Hall & Tawse Ltd.
Higgs & Hill Design and Build Ltd.
Hunting Gate Design and Build Ltd.
IDC Ltd.
James Longley & Co. Ltd.
John Laing Construction Ltd.
John Lelliot Ltd.
JT Design Build Ltd.
Kier Building Ltd.
Arlington Securities
John Lewis Partnership
ICI Engineering
ICL UK
Midland Bank plc
NatWest (Western Region) Property Management
Tesco Stores
TSB (Western Region)
G Osborne Construction Ltd.
Pearce Construction Ltd.
Pochin Contractors Ltd.
Shepherd Design Group Ltd.
Sir Robert McAlpine & Sons Ltd.
Sol Construction Ltd.
Sunley Projects Ltd.
Tarmac Construction Ltd.
Taylor Woodrow Construction Ltd.
Team Services Ltd.
G P Trentham Ltd.
Try Design and Construction Ltd.
Turriff Projects Ltd.
Vat Watkins Ltd.
Walter Lawrence Construction Ltd.
Wilcon Construction Ltd.
Wilkins and Coventry Ltd.
Willett Cementation
Willmott Dixon Design & Build Ltd.
Abbey Hanson Rowe
Akorde Consultants Ltd.
App Partnership
Chapman and Hanson
Colebrook Bosson Saunders
Faith and Company plc
HLM Architects
John A Smith Associates
Taylor Copeman Architects
Kyle Stewart
Lesser Design & Build Ltd.
Lovell Construction Ltd.
R Mansell Ltd.
May Gurney & Co. Ltd.
McStone Construction Ltd.

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Miller Construction Ltd.
Norwest Holst (Projects) Ltd.

APPENDIX II. REFERENCES

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