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DESIGN, DESIGNER AND DESIGNER'S LIABILITY IN CONSTRUCTION PROCUREMENT ROUTES

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A b s t r a c t

In construction projects, the question of who bears the risk and responsibility for the design of the project is often a source of dispute between the project owner, on the one hand, and the architect/engineer or the contractor/subcontractor(s), on the other hand. All parties to a construction project should ensure they have read and understood their design responsibilities pursuant to the terms of their contracts. Most importantly, parties should ensure that the contracts explicitly reflect the intended allocation of design responsibilities and understand all of the consequences of that allocation. Furthermore, contractual parties should also be aware of the situations in which design responsibility, or a standard of fitness for purpose in respect of design responsibility, can be implied into a contract. In a traditional construction contract, design is undertaken by an architect or engineer employed by the employer. The contractor is provided with the design and must build the works in accordance with it. This is an absolute obligation. In design and build contracts a contractor will, in the absence of express words to the contrary, generally be found to have undertaken to provide works that are fit for purpose. One risk is the possibility that the contractor's liability to an employer is greater than the liability that it can pass down to consultants. Any consultant it engages will almost certainly carry out its design function on the less onerous 'reasonable skill and care' basis. In FIDIC forms of contract too there are clauses dealing with the liabilities of the designer. This issue will be kept outside the study.
This paper will try to explore the scope of designer's liability under construction contracts through a review of different procurement routes in use in the construction industry.

1. Introduction

The construction industry is fragmented. It is divided into several separate trades, with labour employed mostly on a temporary basis and plant and

equipment hired only as and when required for particular projects. The firms, too, are divided between main or general contractors and sub-contractors. The separation of clients, general and subcontractors necessitates contractual arrangements between them for construction work to be undertaken. The various configurations of contractual networks coupled with the patterns of risk apportionment constitute the procurement systems in construction. On any construction project it is vitally important to select the right method of procuring the construction works. Not only is it important to choose the right contractor but it is vital that the contract documentation and form of contract is appropriate to the project.

Mohsini and Davidson (1989) defined procurement as *"the acquisition of new buildings, or space within buildings, either by directly buying, renting or leasing from the open market or by designing and building the facility to meet a specific need"*. Approximately ten years later Lenard and Mohsini (1998) modified the procurement definition as *"a strategy to satisfy client's development and/or operational needs with respect to the provision of constructed facilities for a discrete life-cycle"*. McDermott (1999) referred to a definition, which was developed by CIB W92 at its meeting in 1991, of procurement as *"the framework within which construction is brought about, acquired or obtained"*. This and the other definitions sought to emphasize that the procurement strategy must cover all of the aspects of the processes in which the client has an interest, within the whole lifespan of a constructed asset.

McDermott in Rowlinson and McDermott (1999) referring to the formal aims of CIB W92 stated that procurement is *"a social science and the disciplines of history, sociology, economics, psychology, law and politics can all make a contribution to furthering understanding"*.

The National Economic Development Office, NEDO (1985) has a list of nine separate criteria by which the client was expected to set priorities for its constructed project. The nine criteria are: time (is early production required?), certainty of time (is project completion on time important?), certainty of cost (is a firm price needed before any commitment to construction is given?), price competition (is the selection of construction team by price competition important?), flexibility (are variations necessary after construction has begun on site?), complexity (is high quality of the project in terms of material and workmanship and design concept, important?), responsibility (is single-point responsibility important, after the briefing stage, desired? is direct professional responsibility from the designers and cost consultants desired?) and risk (is the transfer of risk of cost and time slippage from you important?). These criteria have formed the basis of much subsequent research into these problems.

The form of procurement is critical as it determines the overall framework embracing the structure of responsibilities and authorities for participants within the process. Therefore, it is a key factor contributing to project success (Cheung, et al, 2001). Developing a model for procurement selection is of strategic

importance and many research works have been carried out and reported (Masterman and Gameson, 1994; Skitmore and Marsden, 1988; Love et al, 1998).

The procurement strategy identifies the best way of achieving the completion of a construction project - often taking into account the best value for money over the entire life cycle of the building or facility. The aim of a good procurement strategy is to achieve the optimum balance of risk, control and funding for a project. The choice of a particular procurement strategy largely depends on a client's required balance of cost, quality and time risks. It must be remembered that the construction project itself may only be a relatively small part of the entire life cycle of the building or facility as a whole. The procurement strategy for the construction project therefore also needs to take into account where and how the construction project sits in relation to that wider picture. The issue of 'sustainability', particularly in respect of public sector works, is a major factor that needs to be considered at this stage. (RICS, 2016)

2. Design And Design Management

Design activity is largely carried out by consultants and in-house disciplines, which translate the aspirations of the Client, into drawn and written media which can be used to procure the construction, commissioning and operation of the whole project. Design, as a creative activity is separate from the fact gathering and brief assembly process that precedes it. Design is synthesis and is used to establish the quality of the project, the cost plan, procurement and construction programs. These reference tools become the performance parameters. The increasing complexity of modern buildings has significantly increased the pressure to improve the performance of the design in terms of time and quality. Design is a difficult process to manage. It involves thousands of decisions, sometimes over a period of years, with numerous interdependencies, within a highly uncertain environment.

Construction design is a specialised and highly demanding form of problem solving (Pressman, 1993; Lawson, 1997) where Stakeholders' needs and requirements are conceptualised into a physical representation of procedures, drawings and technical specifications (Freire and Alarcon, 2000). It is a dynamic and complex multidisciplinary process, performed in a series of iterative steps to conceive, describe and justify increasingly detailed solutions to stakeholders' needs (Sterman, 1992; Ogunlana *et al*, 1998; Baldwin *et al*, 1999). It is the key project process (Morris *et al*, 1999; Cockshaw, 2001), defining up to 70% of the final product cost (Kochan, 1991) and adding value by delivering: functionality; quality; enhanced services; reduced whole life costs, construction time and defects; while delivering wider social and environmental benefits (Treasury Task Force, 2000; Prescott, 1999).

The underlying culture of a project is achieving success through the recognition and harnessing of the skills of all stakeholders in the project.

The aim of design management is to promote shared objectives throughout the design team. An important active element of the team's design management routines is to promote shared objectives throughout this extensive team, through common knowledge and understanding, trust and respect. The process is iterative and includes careful consideration of issues such as constructability, capital and maintenance costs, design life, environmental impact and Health and Safety regulations (CIRIA, 2000 and Tunstall, 2000).

The end-product is only as good as the *design*, and the design is only as good as the *brief,* and the brief is only as good as the *commitment*. The deliverable at each stage of the design process is a direct reflection of the quality of the process that generates it. Clients are demanding not only that buildings be designed and constructed faster, cheaper, and with improved quality, but that services design and construction also be provided. In short, design professionals are being required to re-orient their thinking from a focus on project delivery to a focus on service delivery. This is the essence and core issue in PFI, PF2 and PPP procurement routes in the last 20-25 years.

3. Procurement Routes

Procurement refers to 'the process of obtaining goods and services from another for some consideration' (Hackett et al. 2006 p. 21). They describe the process as being simple in theory – balancing quality, time and cost priorities, but complicated in practice by legislation, the need to achieve value for money, demonstrate accountability and coordinate consultant and contractual roles and obligations to achieve a satisfactory outcome. Murdoch and Hughes (2008) note that the choice of procurement strategy identifies how the project is structured in terms of where responsibility for design is to be placed, how the work is to be coordinated, and the price basis on which the contract is to be awarded. Design and coordination considerations have led to the development of four principle construction procurement strategies as mentioned below.

The overall purpose of a procurement strategy is to select an arrangement that fits for purpose and satisfies the client needs in meeting the main procurement parameters namely, time, cost, quality and certainty. Clients always procured construction services from constructors. That procurement have been realised through different procurement paths:

- Profession – led design procurement path (Traditional);
- Constructor – led procurement path (Design and Build);
- Management forms of procurement;
- Concessions form of procurement.

Each of these routes places the responsibilities for delivering the project with different parties or arrangements of parties and have benefits accordingly. They also place primacy on different aspects of the quality-cost-timing relationships and range from the legally adversarial to the formally collaborative.

In this review traditional, design & build, management contracts and turnkey type of procurement will be studied.

3.1 Profession-led design procurement path (Traditional)

By the end of eighteenth century the role of the architect as an independent designer of buildings was firmly established. At the beginning of the following century the general contractor emerged. These two parties, together with the embryonic quantity surveyor (QS), shaped a common format for contractors to price building proposals in competition. From this model developed the process upon which the current standard forms of building contracts are based (Rougvie, 1987 in Cox and Townsend, 1998). The main characteristic of the traditional procurement path is the separation of design and construction, with the various designers and contractors carrying out roles which are defined and regimented by the various contracts (Marsh, 2003). In this procurement the client appoints a team of consultants to prepare: A design against a brief and budget; Tender documents; Recommendation for the selection of a contractor against a financial offer and programme (CBPP, 1998).

Fig. 1 Contractual Relationships for Traditional Approach

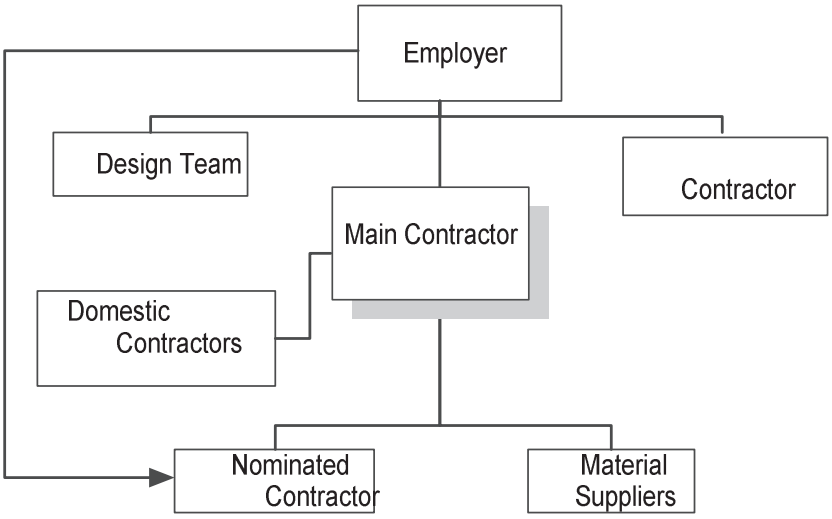
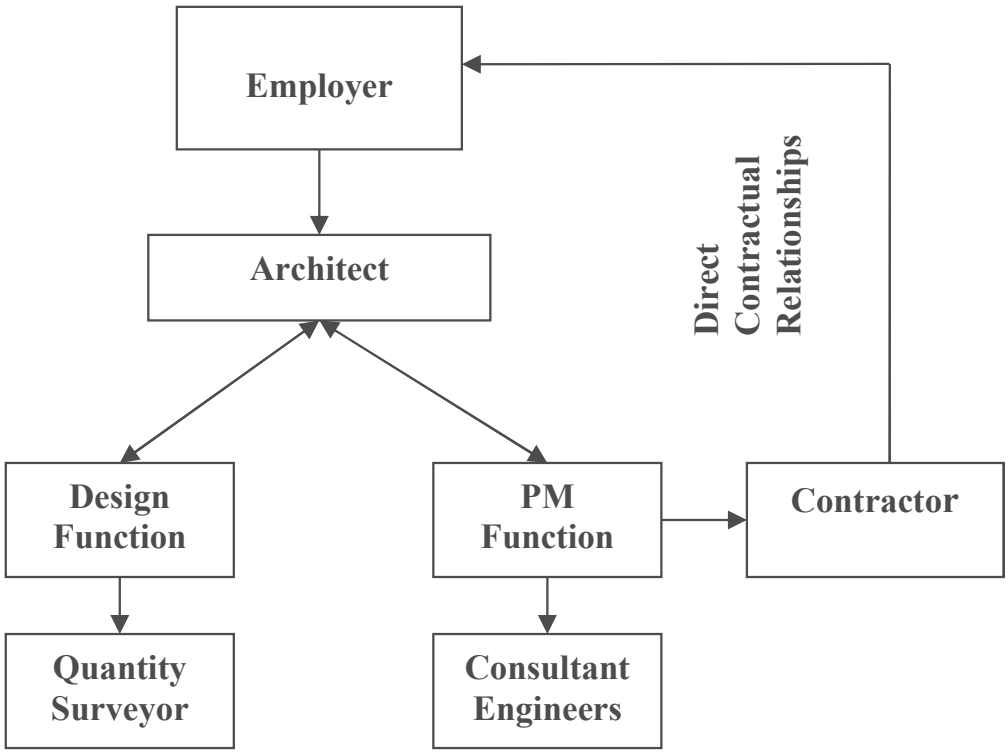


Fig. 2 Design Team Organization Structure in Traditional Procurement



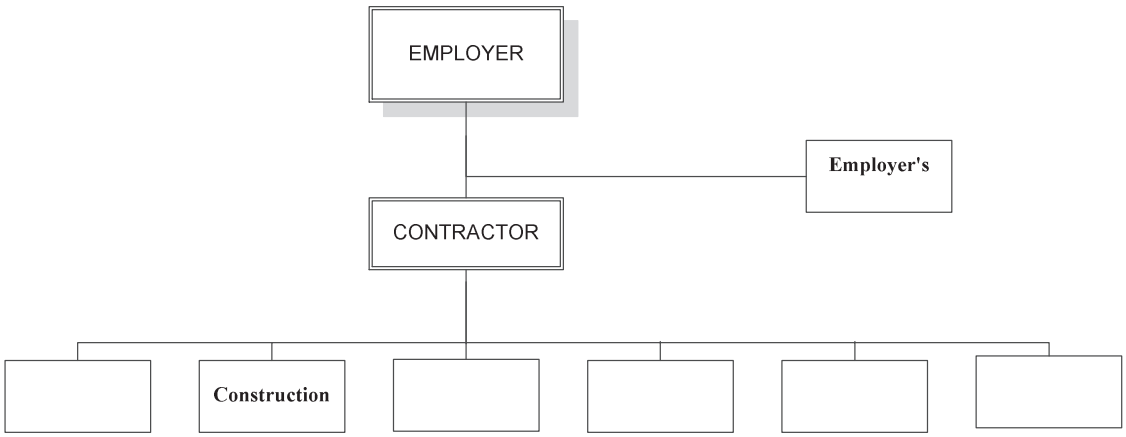
The system of traditional procurement is based on the rigid separation of the design and construction activities (Cox and Townsend, 1998; Marsh, 2003; Walker and Hampson, 2003).
In this procurement the client appoints a team of consultants, usually following the feasibility study, in order to develop the detailed design. The design team prepares all drawings, specifications and bills of quantities, before the process of tendering for the selection of a suitable contractor takes place (Walker and Hampson, 2003; Cox and Townsend, 1998).
The traditional procurement structure produces a high level of differentiation between the contributors which demands a high level of integration.

3.2 Constructor – led procurement path (Design and Build)

The main characteristic differentiating this approach from the traditional one is that the main contractor accepts the responsibility for design as well as construction. This is an integrated procurement path (DoE, 1982; CBPP, 1998). In this procurement one organization takes full responsibility (single point responsibility) and carries sole liability for both design and construction. Knowing the building system well and understanding its limitations one can manipulate ideas very rapidly. This can help to overcome problems caused by

poor or inadequate briefing, which is a particularly important aspect in D&B. The Contractor will be totally responsible for undertaking the design work outlined in the Contractor's proposals for fabricating the building, and for coordinating and integrating the entire process. This includes the appointment of consultants if the Contractor does not have the necessary skills in-house and appointment of sub-contractors. In D&B the Contractor's tender is the price which the Contractor offers to carry out and complete, in accordance with the Conditions of Contract (C.O.C), the works as referred to in the Client's Requirements. The word tender in this context is taken to cover the whole of the Contractor's Proposal including both price and design (Murdoch and Hughes, 2000). The limited scope for variations and changes is a weakness of the D&B. Design liability will be accepted by the Contractor. The Contractor will undertake the conceptual design as well as details.

Fig. 3 Contractual relationships in a D & B project organization



3.3 Management Contracts

Management contract system is a "fast-track" procurement option. It overlaps the design and the construction stages and allows early elements of construction process to be commenced before design has been completed. The management contractor can be appointed early in the design and can advise on buildability and programming. In addition to the contract with the management contractor, the contracts for the individual work packages are between the management contractor and the individual sub-contractors (Gould & Joyce, 2009). This procurement can produce high quality and functional product at a relatively fast speed with reduced delay risk if the contractor is assigned early in the design stage giving him the chance to assess buildability, construction methods and techniques.

There are two variants of the Management Approach, namely Management Contracting and Construction Management (Walker and Hampson, 2003; Cox and Townsend, 1998; Marsh, 2003). The major difference between the two lies in the contractual relationship of the Works Contractors with the Client.

Fig. 4 Contractual Relationships for Management Contracting Project Organization

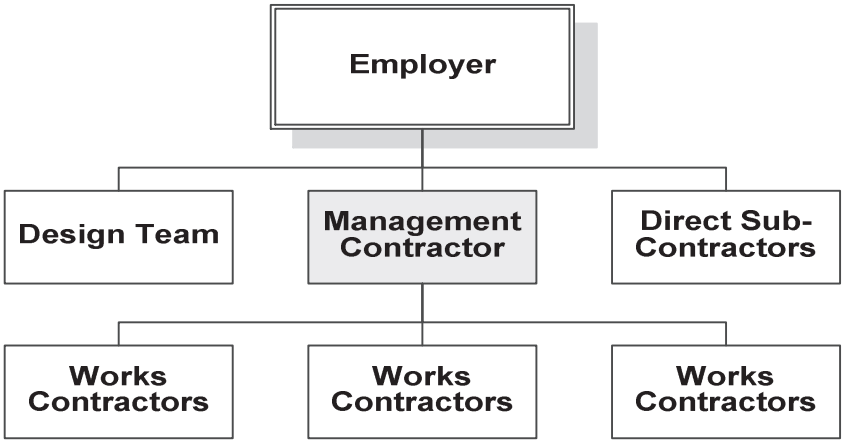
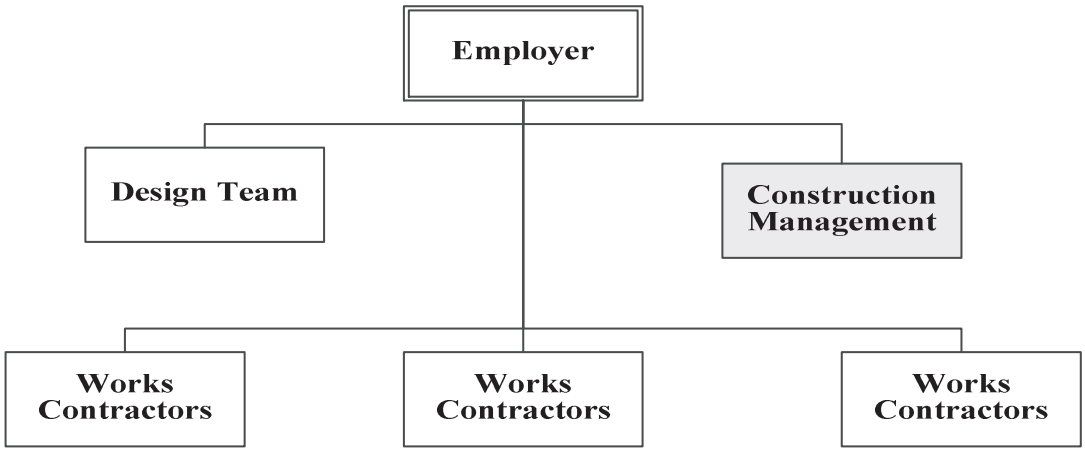


Fig. 5 Contractual Relationships for Construction Management Project Organization



3.4 The 'turnkey' approach

A *turnkey contract* is a business arrangement whereby a project is delivered in a completed state. Therefore rather than contracting with various parties to develop a project in stages, an client enters into a contract with one party (normally a developer or a contractor) to finish the entire project without any

further input from the client. The contractor is separate from the client, and the project is handed over only once it is fully operational. In effect, the developer or contractor is finishing the project and 'turning the key' over to the client. This type of arrangement can be used for construction projects ranging from single buildings to large-scale developments.

4. Design Duties In Law

According to Hughes et al. (2015) some of the factors a court will take into consideration in deciding whether or not a designer is in breach of legal obligations:

4.1 Standard of liability

From a legal point of view, one of the most interesting questions concerning a designer's duty is whether it is limited to an obligation to use *"reasonable care and skill"*, or whether it goes beyond this to a guarantee that the design will be *"fit for its purpose"*. If the "*reasonable care and skill"* is correct, it means that a designer will only be liable if "*professional negligence"* can be proved. The *"fit for purpose"* interpretation, on the other hand, would impose on the designer a type of liability equivalent to that of a seller or other supplier of goods. A guarantee of *"fitness for intended purpose"* will fairly be implied into a design & build or package deal contract. Under a design and build contract, the main contractor will be strictly liable to the client for any defect resulting from an error of design. If the actual design has not been carried out "in-house" by the main contractor, but has been sub-contracted to a specialist sub-contractor, the main contractor will seek to pass the liability down to the actual designer. This can only be done if the designer's liability under the sub-contract is at the same level as the contractor's liability under the sub-contract is at the same level as the contractor's liability under the main contract (Hughes et al. 2015 p.200).

4.2 Duration of liability

Hughes et al (2015) state that a designer is often involved in superintending the process of construction where this is so, it is clear that the designer's responsibility in respect of that design does not end when the contractor receives the necessary documentation and begins to build what has been designed. The designer remains under a continuing obligation to see that the design will work. The precise duration of this obligation undoubtfully lasts until the date of practical completion, almost certainly throughout any defects liability period, and probably until the issue of the final certificate (Hughes et al, 2015, p.202).

4.3 Design function

Design function is the compliance with the statutory requirements. The proper carrying out of a design function clearly includes the task of seeing that the designed works can be carried out lawfully. This means that the works will not contravene Building Regulations, planning law or other relevant legal requirements. In this respect, as with other aspects of design, the law draws a distinction between someone who merely designs and someone who operates under a design and build contract. (Hughes et al, 2015, p.203). In general terms a design decision is, "any decision that affects the final form or composition of the building is a design decision" (Lupton, 2013). Construction is a complex process, with many parties contributing to the design of buildings, including consultants, contractors and specialist manufacturers. There are three main items that provide an indication of the design liability:

- The procurement route selected,
- The skills of those involved,
- The contract documents agreed between the contracting parties.

A designer impliedly undertakes only to use *"professional skill & reasonable care"*, and does not warrant that design will not contravene any *relevant legal principle*. By contrast, a contractor under a design and build contract will be strictly liable to the employer for any breach of the Building Regulations (Hughes et al, 2015, p.203). In the UK, The Construction (Design and Management) Regulations 2015 impose severe and wide ranging obligations on all designers, the breech of which carries criminal penalties. The most important of these obligations is that designers must do everything reasonably practicable to avoid danger to the health and safety of anyone working on the site, or affected by the work.

4.4 Liability for Professional Negligence

According to Lupton (2013) negligence refer to "breach of an obligation – either express or implied – in contract to use *"reasonable skill and care"*. The terms of a contract, arising out of the relationship between designer and employer, may consist of express and implied terms. Standard forms of appointment normally contain on express obligation to exercise *"reasonable skill and care"*, and if none were included such an obligation would normally be implied.

A person holding themselves out as being a "designer", whether or not they possess qualifications, impliedly warrants that they are reasonably competent to carry out the task (Lupton, 2013 p.97). Furthermore, Lupton (2013) state that the failure to afford the requisite skill which has been expressly or impliedly promised is a breach of legal duty. Besides, Lupton (2013) insists that, every person who enters into a learned profession undertakes to bring to the exercise of it a *reasonable degree of care and skill*. In order to establish that there has been

a *breach of duty* by the designer that has caused any *damage*, it must be shown that the designer was *negligent*. This is the meaning of *negligence* in a contractual context.

What is actually the *"professional negligence"*? Negligence; is the omission to do something which a reasonable man, guided upon those considerations which ordinarily regulate the conduct of human affairs, would do, or doing something which a prudent and reasonable man would not do (Lupton, 2013, p.98). It should be understood that *"reasonable skill and care"* is not an all-embracing obligation in the sense of describing all the designer's obligations but rather a convenient framework against which to assess particular and precise points. The exact level of skill and care that ought to have been applied in a particular case will of course be decided by the court (Lupton, 2013, p.99). In deciding whether there is negligence, it is necessary to look at what an ordinary competent designer exercising the particular skill would do and to compare that with the actions of the person against whom the negligence is alleged. In this case, the court will therefore usually hear evidence from expert witness (ibid).

"Fitness for purpose" liability occurs when a contractor undertakes to design and construct a building for a client, the implied obligation is often stated to be to deliver something *"fit for purpose"*. The distinction between the use of *"reasonable skill of care"* and an obligation as to *"fitness for purpose"* is important. A consultant will, of course, endeavour to design something that meets the Client's requirements. However if the design fails to achieve this, the consultant will not necessarily be liable; the client still has to prove there was negligence. When a contractor designs a building, the result should normally meet any requirements made known by the client. If it does not, the contractor will be in breach of contract regardless of how much care was taken in the design. A *"fitness for purpose"* obligation is in fact a shorthand way of describing a strict obligation in the context of design (Lupton, 2013, p.107).

Summary

The design process should be given appropriate time and resources in the construction programme to deliver the best results against the requirements of the output specification. The choice of procurement route depends on the Client's required balance of time/cost/quality and an analysis of how that can be achieved. A civil engineering contractor is normally entitled to sub-let work. Since the employer seeks a defined result, the employer can look to the contractor to perform the contract or to pay for its non-performance in any event. In the case of design or other professional contracts, different considerations may apply. The professional is frequently chosen because of his skill, reputation or flair in a particular field and a client might be rightly aggrieved to find that the work which he had entrusted to a particular person had been delegated or sub-let. In addition, the consultant's obligation is not normally to achieve a

specified result but to exercise reasonable skill and care; accordingly, difficult questions of liability may arise where the designer sub-lets the work to an apparently competent person. Several questions arise here which will influence which contract can be used and which is most effective.
Conclusively as O'Reilly, (1999) stresses the composite form "professional negligence" is used to indicate either a breach of a term in a contract requiring the professional to exercise reasonable skill and care, or a breach of a duty owed by a professional in tort. This dual use derives from the fact that the duties owed in the tort of negligence and under a professional contract are identical. A professional does not necessarily breach his duty by making a design error or by supplying bad advice. He will be in breach only if he fails to use reasonable skill and care.

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