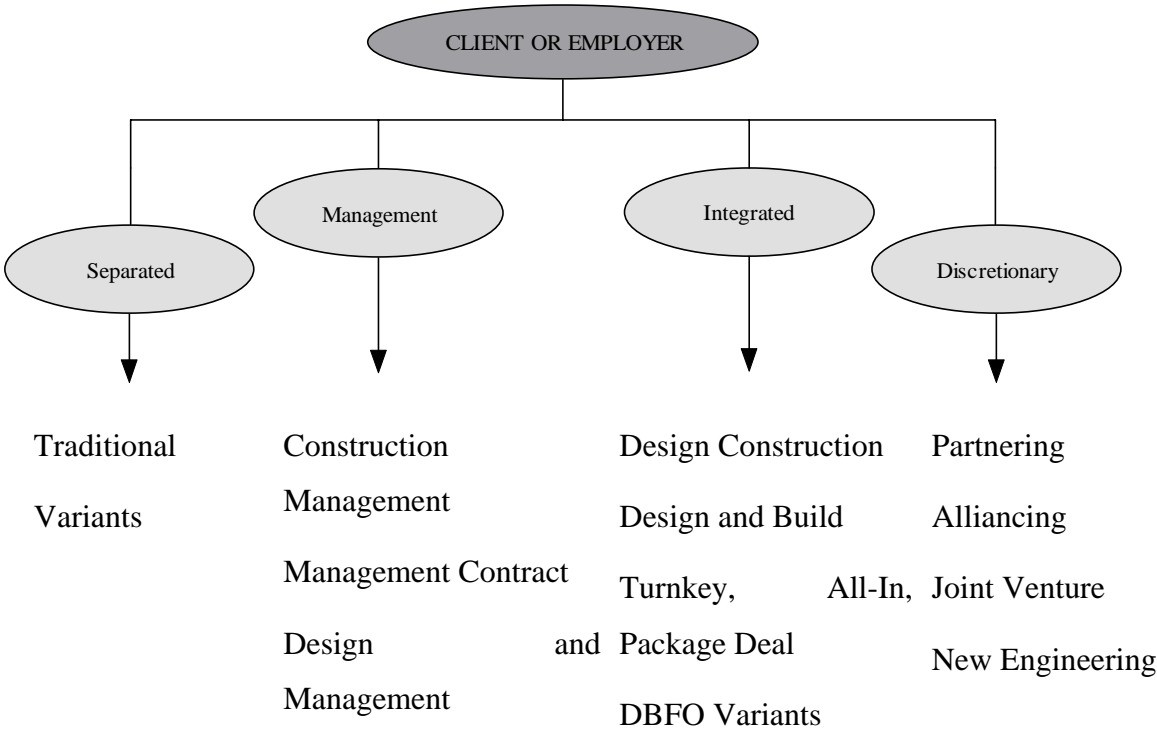


3.1.3. Signing the contract with the consulting engineering company

The basic types of international construction contracts are:

- Separated, e.g. traditional contracts
 - Lump sum
 - Bill of quantities
 - Schedule of rates
 - Fixed or percentage fee
 - Cost reimbursement
 - Target cost +Two stage tender
 - Direct labour
- Management oriented contracts
 - Management contract
 - Construction management contract
 - Design, management and construction contract
- Integrated, e.g. design and build contracts
 - Design and build contract
 - Turnkey contract
 - Private finance initiative contract
- Discretionary, e.g. Partnering
 - Partnering
 - Alliancing
 - Joint Venture contract
 - New engineering contract.

These types of contracts are shown in Figure 1.



Separated and co-operative contracts

Clients have always wanted to engage someone able to represent their needs into a clear design before proceeding with the construction phase, by preparing the scope, architectural aspects and also building details where possible. That is why a construction firm is separately contracted to build a project. An architect or civil engineer is usually appointed as the client's adviser and project leader responsible for the design, specification, and co-ordination of all the design input from other specialists, in order to produce a comprehensive set of documents to be put out to tender.

The parties in a traditional separated construction project include the client being the person or firm requiring the work to be executed under formal contracts and responsible for payments. The architect and other specialists such as engineering services design undertake agreements describing the services to be provided, and the fee to be received. Payment to the architect for site supervision is usually an extra cost, with the contractor executing the work in accordance with the architect's engineer's drawings and/or instructions. Technical design should be ready before the tendering process so any variations caused by changes in the quantity of work or site conditions are usually issued as written instructions by the architect or

engineer. However, there may be slight differences in this principle depending upon the particular conditions of contract.

Lump sum contract

A contractor is invited to tender on the basis of drawings and a specification. Usually there is no provision for adjustment to the quoted price during execution of a contract, unless the client introduces changes subsequent to the letting of the contract. The contractor is responsible for all the costs connected with fulfilling the requirements shown in the drawings and in the specification. The price is often subdivided, depending on the phases of work done.

Bill of quantities contract

In some European countries clients or their advisors prefer to provide contractors with a common document for pricing in the form of a bill of quantities (BOQ). In civil engineering this is based on a detailed bill of approximate quantities, while for a building contract the quantities are prepared by the professional quantity surveyor. The bill is derived from the drawings and itemised into elements according to one or other standard method of measurement. Each item contains a brief description of the work to be undertaken, and its quantity. The contractor enters a unit rate and price for each work, (allowing for labour, materials, plant, subcontract work, temporary works, and prime cost items), which finally gives the bid figure. During the execution of the project the actual quantity of work achieved for each item is valued at the quoted price from the BOQ. (Additional work is usually re-valued at existing rates for similar work). This is the principle of re-measurement.

Schedule of rates contract

Many projects are so complex that completed designs are impossible to formulate before tendering and development of the details has to be produced as the construction progresses. In these circumstances the bidder is requested to submit a unit price or rate against a list of work items typical of those expected for the work. Payment to the contractor for the actual work done is made on a similar basis to a BOQ contract, with items measured and paid at the quoted rate.

Cost reimbursement contract

Depends on the payment of a fee to the contractor for executing the work, the method being intended to allow work to proceed as the design develops. The disadvantage lies in the

opportunity for the contractor to increase the direct costs of the work, and thereby transferring most of the risk to the client.

Fixed or percentage fee contract

The contractor and client (owner) both agree on a fee beforehand, just to cover head office overheads and profit. The direct costs of the work are paid by the client as work proceeds, based on the agreed costs such as salaries, wages, materials, equipment, consumable stores and sub-contract payments. The total final cost to the client is therefore the sum of direct costs plus the fee.

Target cost contract

To overcome the disadvantages of the ordinary fee contract, clients try to encourage contractors to be more cost conscious by relating the fee to an agreed target estimate based on a set of drawings and specification or alternatively a bill of quantities. However, during the construction phase provision is made for adjusting the target estimate for variations in quantities. The actual fee paid is determined by increasing or decreasing the original fee by an agreed amount calculated on the saving or excess between the actual cost of the work and the target figure adjusted for any variations.

Two-stage tender

Few of the previous methods have proved satisfactory to clients and their advisors for projects where the design is incomplete at the time of tender. On particularly complex and large projects two-stage tendering may permit improved control of costs, providing the contractor is prepared to be co-operative. Usually three or four very experienced firms are invited to tender after a detailed discussion with the client's advisors on matters relating to the type and scope of the work, and the ability of the companies concerned. Each contractor prices an approximate bill of quantities or a schedule of rates organised to reflect the elements of the work. However, after selection of the contractor, the second phase requires the chosen firm to collaborate with designers by giving advice on construction methods, equipment, subcontractors' work packages, orders of priority, programme and procurement dates, etc. The expected price to the client is then calculated and the contract proceeds on this basis.

Direct labour

Some clients have in-house labour, for example government departments, local authorities, nationalised industries, employed to carry out construction work either designed internally or

by outside consultants. A formal contract is not entered into but competition can be achieved by inviting outside contractors to tender.

Management oriented contracts

Over the last years clients of large civil engineering work have all too often experienced difficulties in obtaining projects finished on time, to budget, of acceptable quality and serviceability. This is the case especially when designs are incomplete before contractors are appointed, and complex projects being particularly affected.

In the management oriented contract the construction manager joins the professional team at the earliest possible time. Responsibilities cover preparing the overall construction program and works packages, steering these through the design stage, recommending subcontractors and securing their smooth integration. The combined design and supervisory functions of the traditional architect/engineer are removed, being executed separately by the appointed professional team.

Considerable experience is essential in judging the viability of the proposals particularly where subcontractors are expected to bid and execute contracts on an agreed program and design documents, including the co-operation with other parties involved on the project. Well established traditional forms of agreement generally apply to the management contract with contracts between client and designer, client and contractor, contractor and subcontractors. The principal contractor has few obligations to execute actual construction work. A fee is charged for co-ordinating the subcontractors and advising the design team. Similar contractual arrangements are provided for design and management contracts.

Construction management

The construction manager is appointed early to provide a planning, management and co-ordination function. As all the actual orders with the various works contractors are with the client, the construction manager carries very little risk. The construction management firm is not allowed to carry out any construction itself, but takes responsibility for advising the designer on build-ability, including preparation of suitable work package contracts, arranging procurement contracts and managing the bidding phases of the works contracts. The main disadvantage to the client is the lack of a fix tender price at the selection stage, other than an approximate price. The potential cost becomes known, as tenders submitted by works contractors are accepted.

The management contract

Many clients are not prepared to bear the risk of many packages needed on large and complex projects, normally associated with construction management. As a consequence there has been a trend towards employing a single contractor early to provide planning, management and co-ordination of construction. However, like in construction management the principal contractor is barred from carrying out any construction work itself, although on some projects common items for sub-contractors, e.g. scaffolds, tower crane and access roads are provided. The management contractor obtains a fee for performing similar duties to the construction manager, but carries more risk.

Design and management contract

As a natural development from these new systems clients have invited principal contractors also to take responsibility for managing the design phase. The contractor offering the lowest cost scheme for full design, management and construction is normally selected, but reputation, quality of service and management fee charged are also important factors. The system offers similar advantages to design and construct contracts, with improved control of the design and procurement processes.

In management oriented contracting the quality management problem requires the managing firm to encourage and invite for tender only subcontractors with an ISO 9000 or similar accredited quality system and a proven record of producing good quality work. Procedures for assessing works subcontractors' proposals for achieving specified standards should be established at the outset and then rigorously upheld. The aim must be to achieve standards reached in the manufacturing sector where companies compete on quality as well as price.

Integrated contracts

The whole project covering design and construction is normally undertaken as a single contract with perhaps two or three highly experienced contractors, usually invited to submit proposals. Competition is introduced at the design stage through the price offered for the completed project, including commissioning, operation and maintenance if necessary. Clearly the client will need considerable experience in agreeing with the contractor what is to be provided, its specification, and method of payment. Simple office blocks, industrial buildings, housing, car parks, etc. have been successful with this system (sometimes even large and complex civil-engineering projects). The contractual relationships are shown in Figure 3.3. An advisor may be appointed, but usually only to monitor the various aspects of the work and

provide commercial management should the client feel the need to engage this kind of service when lacking sufficient in-house expertise.

Design and construct contract

The client (owner) separately employs an advisor to arrange for an architect in the case of building contracts to produce drawings generally relating to specific functional or essential aesthetic details and a specification fully describing the design. The contractor secures all statutory approvals, and supplements the documentation with his own working drawings.

Design and build contract

The contractor is responsible for construction and full design, including the production of the working drawings together with obtaining all statutory approvals.

Turnkey, all-in, package deal contracts

Different arrangements such as design build finance-operate (DBFO), etc. are gaining popularity, particularly for large infrastructure projects co-financed by government. The developer is responsible for devising the scheme, raising the finance, operating the facility and finally transferring ownership e.g. after sufficient local experience has been gained in running and managing the facility.

Arrangements of this kind have usually been found in countries where problems in raising a capital exist therefore experienced firms with access to international finance are required to take the lead. However, some projects using this method can be found in the advanced economies, commonly referred to as the Private Finance Initiative (PFI), where private finance is introduced into projects customarily funded wholly by government. The national budget is thus relieved of a large forward capital payment (off balance sheet).

The private finance initiative (PFI)

Private financing arrangements are familiar to the construction industry. For example in work for foreign governments, where financiers such as major banks in conjunction with developers (including sometimes contractors themselves), commonly undertake DBFO. For example, in the case of hospital schemes now well under way in the UK, the developer might be paid on a leasing basis by government for building and maintaining the facility according to the number of beds provided regardless of availability.

Discretionary contracts

Even with the new forms of modern technique, large projects such as power stations, airports, oil refineries and similar complex utilities have still proved difficult to manage in total, i.e. from inception through to commissioning and handover. The reasons are many, but in essence relate to unique single project procurement and the lack of stability in relationships between clients and their designers/constructors made more difficult by the inability of clients to adequately define their needs.

Partnering

Originally developed for engineering construction-type work, partnering is normally regarded as the strategic and long-term arrangement whereby a partner e.g. contractor is selected by a client/advisor for a series of projects. The aims of such arrangements include lowering costs and improving efficiency, thereby reducing delays and ensuring completion of projects on time, to budget and quality, although single project arrangements increasingly are also being included in the terminology. Contractors need to be carefully selected based on a whole series of performance measures related to quality and competitiveness, usually conducted through a two-stage tendering process.

Partnering usually involves the client and their advisor in selecting a particular contractor, negotiating a price for the envisaged project, establishing the programme and agreeing terms and conditions of contract, but with the main objective aimed at generating a spirit of co-operation. In particular the contractor is encouraged to put issues to the client at the outset and continue with open attitudes throughout the contract.

For partnering to be meaningful, the client should be well experienced in construction procurement and possess considerable 'in house' skills relating to the design and construction of projects in order to have a meaningful dialogue with the contractor.

Alliancing

Some big clients, who are able to offer a series of major long term construction opportunities, for example the petrochemical industry, have begun to extend Partnering to embrace Alliancing. Here successful partners, both designers and contractors having demonstrated full commitment in terms of previous behavioural attitudes, are invited to co-operate in developing new schemes. The client's project team, designers and contractors jointly prepare target costs coupled to a risk/reward structure based on the final outcome, the implication being that future opportunities will only be forthcoming if the final product meets the client's satisfaction. The project itself is led by the client's Project Manager heading a team

comprising managers from each of the principal parties responsible for implementation of the project, management and administration of the works contracts.

Joint venture

The unusual step beyond partnering is the joint venture contract between a major client and providers of the construction project. A 51 % majority shareholding in the joint company provides controlling ownership for one of the partners but depending upon circumstances other proportions are possible. Great care in evaluating the risks and levels of commitments of each, together with establishing sound business and management relations is essential, otherwise conflicts will eventually surface concerning strategy, decision making and management style.

New engineering contract

This form of contract also aims to reduce adversarial aspects. The document specifically defines the role of the supervisor (leader) and the responsibilities of an adjudicator. In this manner anticipated ambiguities should be reduced, particularly with respect to design and supervision roles.

This contract's proposal contains some packages suiting particular projects, for example: engineering and construction contract, professional services contract, or adjudicator's contract.