

Why piling tenders are qualified

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Estimates indicate that sub-contractors carry out about 70% of all construction work in the United Kingdom. Despite this important role, experience suggests that little attention is paid to subcontractors' interests or to their sphere of activities by other parties within the Building Industry, even when the sub-contract work includes design. This observation applies even more to piling contractors than to others, because their activities fall into the class "civil engineering" whilst the majority of their work is carried out within the "building trade" which traditionally thinks in terms of superstructures and the finishes to them. A piling scheme when installed must carry a structure so that a property owner can enjoy beneficial occupation of the building for decades. When documents forming an enquiry are studied and the nature of the commercial bargaining that can take place prior to the award of a sub-contract are taken into consideration, it often appears that sight of this ultimate goal has been lost. In such circumstances, a piling contractor has a duty which may well lead him to qualify his offer. Those items which persistently claim qualification and discussion include the information provided on ground conditions, specification, restrictions on working methods, services and facilities required, working areas, design and certain contractual conditions.

If problems arise with the piling, before or after tendering, the most likely cause lies with the supply of inadequate information of the nature of the ground. Typical examples of the absence or inadequacy of information involve

items such as: the ground level from which the site investigation bore was commenced; whether or not the investigation bore was cased; the stabilised ground water level; an indication of ground water pressure; misleading descriptions of the strata; wrongly recorded stratum thickness; insufficient number, inadequate location and depth of boreholes; and site investigations supplied by Employers that have not been produced by suitably qualified engineers. Sometimes the enquiry indicates that the professional team appreciates the possibility of shortcomings in reports by including a disclaimer for the information provided. Linked with this disclaimer is a requirement for an unqualified tender at a competitive price, accompanied with a form of warranty. In view of comments that have, in the past, appeared in the technical press many site investigation companies cannot fail to be aware of the inadequacy of some of their reports and should endeavour to correct the situation. An inadequate site investigation must by its very nature result in the production of a specification and a design for piles which may not be suitable for the structure to be supported. Such a situation offers no benefits to a piling contractor and the best it can offer to an Employer is a transitory attraction in some saving of preliminary costs.

The ICE Piling Model Procedures and Specifications, and CP 2004 are sound basic guides to piling in general even though their contents invariably lag behind the current state of the art. Their shortcomings therefore need to be borne in mind when a specification, which should be drafted to meet requirements for a particular structure on a particular site, is written. However, it appears generally not to be the rule to draft a specification for each individual contract and specifications presented with enquiries usually fall into either of two distinct categories, i.e. compendium specifications covering every form of piling or the standard specification of an engineering practice for a particular form of piling. The latter frequently incorporates every experience of a consultant's office in recent years so that, hopefully, the requirements of all sites may be catered for. The former is imprecise because it leaves the estimator and the site staff unsure as to which particular part of the specification will be applied in any given circumstances by the resident engineer. The standard type of specification, whilst confining itself to a particular piling system, may be equally imprecise for a given site, since it may include requirements which are at best inapplicable and at worst plainly impossible. One fairly common clause imposes an obligation to descend bores to inspect the strata before placing concrete, but this clause is unlikely to be deleted when the method of construction

requires the bores to be full of a bentonite suspension. As the duty to inspect usually lies with the resident engineer, it is not too difficult to advance persuasive arguments for a waiver.

Both forms of specification give rise to problems when there are unforeseen variations in the nature of the ground, because it can be held that the tendered price includes for all the specification's clauses and that the piling contractor has an obligation to satisfy himself in regard to the nature of the ground. The extreme to which this point of view is developed depends to a great extent on which Standard Form of Main Contract is used, the drafting of the particular conditions of contract, and the Employer. The argument that a sub-contractor should submit an unqualified tender and thereby carry a risk that could exceed the total value of the erected structure because of incorrect specifications, or because the information supplied was not warranted as being factual, does not make commercial sense. A piling contractor therefore often has no choice but to qualify a tender if he is to take upon himself obligations which he must honour.

Consider a situation in a practice or company when an item of equipment or plant is to be purchased. The prospective purchaser examines manufacturers' specifications to acquaint himself with the major components and performance. After a careful study, a machine is purchased that will fulfil the purpose for which it is intended and the purchase price is accepted as being linked to the specification. The principles just stated apply with equal force to a piling scheme. A specification for piling should detail the major component parts appropriate for the nature of the ground at the site and should state the performance expected from an individual pile. An incorrect specification may involve the Employer in unnecessary expense, either by demanding a pile that is more costly than that required for the structure, or by producing a pile that is inadequate, thus requiring instructions to vary the installation or to carry out remedial works. Concrete is the major and most costly component of in-situ load-bearing piles in this country, yet it does not always warrant a special mention in specifications. The piling contractor is often directed to the section of the specification for concrete in the strip foundations or the superstructure, and this sets out mix details that are not suitable for concrete which has to be placed by free fall, or tremied, sometimes to depths in excess of 35m. From experience, piling contractors have developed particular concrete specifications for their piling systems and failure to specify a mix appropriate to the piling method will invariably invite alternative mix details to be offered.

In terms of the performance of a pile, settlement is the item that is most frequently over-specified. An extreme situation sometimes occurs where the permitted settlement is less than the likely elastic shortening of the concrete in the pile.

Also, the proof loading of piles is often incorrectly specified when considered from a practical and economic point of view. Testing is a relatively neglected subject, considering the expense and time involved in carrying out any one test, and bearing in mind the fact that it only provides information on one pile in a particular location. In areas such as London where the behaviour of the clay under load is well documented, and where the results could often be predicted with a reasonable degree of certainty for particular types of pile, it seems unnecessary to call for a preliminary pile test for a site requiring few piles. The money might better be spent in providing the installed piles with a higher factor of safety.

Commercial pressures, or lack of understanding, are also creating a topsy turvey approach to pile testing; instead of a preliminary test pile, or trial pile, being installed to provide data for an economic or feasible solution, or to confirm the original design criteria before proceeding with the main piling, preliminary type tests are frequently specified to be carried out during the course of the main piling operation. This situation is usually coupled with a demand that the piling contractor should shoulder all liabilities if the result when obtained is not within some limits as specified, or anticipated when no settlement criteria has been given. The consequences of an unsatisfactory test result in such a case may lead to problems incapable of easy resolution, and when the necessary action has been taken, the cost may far exceed any monies that were expected to be saved by shortening the construction time.

A normal test load gives no direct indication of the behaviour of a pile over a long period, yet some specifications call for maximum proof loads to be maintained for up to seven days. As no useful knowledge is gained from extending load-holding periods beyond the point where settlement rate reaches an acceptable level, an Employer's money might in such circumstances be considered as being expended on an activity from which no benefit is accruing. The ICE Piling Model Procedures and Specifications sets out a rate for loading and unloading a proof test in which the minimum time for holding the load at the working load (WL) or $1\frac{1}{2} \times \text{WL}$ is six hours. From a practical point of view this could be considered a maximum load-holding period if the behaviour of the pile through the other increments of loading has followed a normal pattern and if settlement rates comply with those given in the document.

Sometimes horror pictures of exposed piles possessing voids, breaks, waists are shown to illustrate talks. These are the piles that have been discovered and one may wonder how many such specimens exist that have not been found. The primary objective of every consulting engineer and piling contractor must be to ensure that his job does not become a source of more dramatic pictures of this type. The consulting engineer, by ensuring that his specification is reasonable and appropriate for the work to be executed, has

an important role to play in ensuring pile integrity. If, for example, the ground conditions are such that permanent casings are required to remove any risk of defects, they should be specified and included in the bill of quantities as a measured item. It can be very unsatisfactory to leave items such as this for the piling contractor to include if he considers necessary; the lowest price may well be achieved by not taking such an item into account.

By employing skilled and experienced staff the piling contractor should ensure that the materials and workmanship are correct for the conditions encountered, and he should maintain a close working relationship with the consulting engineer's staff to make certain that the design concepts are being successfully fulfilled. In spite of vigilance by all parties involved in piling operations, the very nature of the ground in which piles are placed and the physical conditions under which they are formed create an environment in which there is an inherent risk that some of the constructed piles may possess defects of varying magnitude, especially when the strata are not self-supporting or when water is present in the bores. If defects are neither apparent when the head of a pile is exposed nor are suspected because of conditions observed during construction, building of the superstructure proceeds on the basis that all the piles on the site are sound. Until quite recently there was no satisfactory and economic method for checking the integrity of every pile on a site, so in the event of one defect being found there were always doubts and long debates about the integrity of the remaining piles. Now the era of the micro chip has created new possibilities for obtaining information about a pile in the ground, speedily and at reasonable cost. Whilst this new technique is no substitute for correct specifications and good workmanship, it can produce information which should permit balanced judgements to be made regarding the general integrity of a pile. Developments are such that similar techniques will in the not too distant future be available, and will hopefully be accepted, to check the load capacity of a pile.

In addition to the vagaries of specifications and bills of quantities, the rulings of the judiciary on the liabilities of professional persons are beginning to manifest themselves in the reluctance of Architects to nominate sub-contractors where there is a design element in a sub-contractor's offer. Instead they are recommending that a contractor accept a named sub-contractor. This current trend in the procedure for tendering and letting sub-contracts may ultimately create more problems than it is intended to solve, for it appears that the contractual requirements are being carried out on an *ad hoc* basis and in a way that is contrary to the requirements of the standard forms of contract, and sub-contract, which have mutually been agreed between the professional bodies and the representative bodies of contractors and sub-contractors.

This change in the procedure for selecting specialist sub-contractors has been described in one contract document as being to the mutual benefit of all parties involved. For a sub-contractor this explanation is difficult to fathom as he must accordingly qualify after

taking into consideration the following disadvantages:

- (a) the benefit of direct discussion on design matters between consulting engineer and sub-contractor is contractually removed once the sub-contractor has entered into a domestic form of sub-contract,
- (b) contractors usually enforce their own forms of sub-contract in place of the standard form which has been mutually agreed between the representative bodies, and
- (c) forms of warranty which have diverse wordings are produced to create a direct commitment of the sub-contractor to an Employer.

Departure from the agreed standard approach to contractual commitments is bound to lead to arguments and disputes which in the end cannot be beneficial to the Building Industry in general, for failure to get the contractual relationships right as a whole may well end in costly dispute years later.

If the specifications, general conditions of contract and the forms of warranty usually create grounds for qualification, the design brief invariably does. This is not because it is too elaborate, but because it is too vague. Statements such as "insofar as the sub-contractor is responsible" are often used as a blanket for design and construction, but are imprecise. The ICE Piling Model Procedures and Specifications recommends that where contractor-designed piling is to be used, special attention must be paid to the definitions, criteria and responsibilities. This advice is fundamental, because the absence of a stated design brief could create a situation where omissions and misunderstandings become common rather than exceptional. Unless instructed otherwise, piling contractors usually only design individual piles to carry specified loads; they do not, nor can they be expected to, integrate the piles into the structure.

When it comes to the construction of the piling works, the particular piling system offered and the magnitude of loads to be carried, have a substantial bearing on the needs of a piling sub-contractor in the form of facilities and services, yet this is not often appreciated by main contractors. The sheer size of the equipment when it arrives on site is a shock to some contractors' site staff and it soon becomes obvious that, on small sites, other building work cannot be carried out simultaneously with the piling operations. This may of necessity disrupt the main contractor's programme and the plans that have been made by him for the progress of the job in general. From experience some standard qualifications are inserted into piling tenders to safeguard the piling contractor from a main contractor's inexperience or lack of foresight. When there is a heavy concentration of piling plant, which is constantly on the move, adequate working space is essential for a safe environment. In their haste to produce short programme periods this requirement not infrequently appears to be overlooked by many main contractors. Dangerous situations must not be created and the proper time to foresee this kind of problem is at the tender stage.

Experience gained from integrity testing is indicating that faults are being created in pile heads, particularly in those of the smaller diameters, due to the trimming back of piles to

their final cut-off level by equipment which is unsuited to such work, lack of care in the handling of an excavator when digging around pile heads, or using the tops of piles as temporary work supports when they have not been designed for such a purpose. As specifications are usually mute on these points another qualification could well be appearing in piling contractors' offers.

The points brought forward in this Talking Point are meant to explain to the reader why piling tenders are often qualified, in spite of forms of tender which specifically ban qualifications under the penalty of not having the submission considered. Perfect enquiry documents and tenders will never be achieved but practical ones should be within the bounds of possibility. To go some way

towards this end, the Federation of Piling Specialists have issued guidance to the industry in the form of a "Specification for Cast in Place Piling" and a "Specification for Cast in Place Piles formed under Bentonite Suspension"; other publications are now in hand.

Minutes of the Forty-first Annual General Meeting of the Institute of Quantity Surveyors held at 98 Gloucester Place, London W1H 4AT on Friday, 18th June, 1982 at 12.15 p.m.

The President, Mr P E T Spencer, was in the Chair. Forty-six members were also present, together with the senior staff of the Institute.

1. Notice of Meeting

The President welcomed the members present and formally declared the meeting open. It was agreed that the Notice convening the meeting, which had been circulated to all members of the Institute in the May issue of *The Quantity Surveyor*, be taken as read.

2. Minutes of the Fortieth Annual General Meeting

The Minutes of the Fortieth Annual General Meeting held on 19th June, 1981, had been published in the August, 1981, issue of *The Quantity Surveyor*. No comments having been received, it was proposed by Mr R B Parker, seconded by Mr H S Crowter, and unanimously agreed, that the Minutes be confirmed as a true record of the proceedings, following which they were signed by the President.

3. To consider and, if approved, adopt the Report of the Council for the year ended 31st December, 1981.

Introducing this item, the President said he would like to highlight some of the more notable aspects in what had been a year of increasing activity. The new Board and Committee structure which had been introduced last year had proved successful and he drew particular attention to the work of the new External Affairs Board. The successful implementation of the new Experience Requirements placed a considerable workload on the new Experience Committee, whose membership, as a result, had been strengthened.

The 1981 Branches Conference had been particularly noteworthy, with three distinguished speakers giving their views on a challenging theme, and he was glad to report that, in a period of economic recession, the membership of the Institute had continued to grow. He said he would also like to pay tribute to the work done in the Branches, most of which he had visited during 1981/82, and he had been particularly impressed with the enthusiasm and interest shown by the various Branch Officers and Committees, not only in the UK, but also in Hong Kong, which he had recently visited.

Finally, the President referred to the

unification discussions with the RICS which had recently been concluded. At a special meeting of the Council on the 17th June, the document setting out the proposals for the unification of the RICS and the IQS had been approved, and would be circulated to the membership in August. The QS Division of the RICS had also given approval to the document and, in conclusion, he wished to thank the members of the Unification Committee for their support, also the three Vice-Presidents, the members of Council, and the many members of the IQS for their help during his year of office, as well as his wife, his firm, and the IQS Secretariat.

It was then proposed by Mr A T Ginnings, seconded by Mr J H Scroton, that the report be adopted.

The President then invited any comments from the meeting on the contents of the Annual Report. Mr C R Vincomb, referring to the work of the Institute on external relations, felt that more should be done to appraise the general public of the costs of building work.

There being no further comments, the proposal that the Report of Council for the year ended 31st December, 1981, be adopted was put to the members and agreed unanimously.

4. To consider and, if approved, adopt the Accounts of the Institute, together with the Auditor's Report for the year ended 31st December, 1981.

The President said that the published accounts for the year ended 31st December, 1981, had been circulated with the Report of Council. It was then proposed by Mr L T Patterson, seconded by Mr M R Edwards, that the Accounts of the Institute, together with the Auditor's Report for the year ended 31st December, 1981, be adopted.

Mr A M Knapman, referring to the Income and Expenditure Account for the year ended 31st December, 1981, asked for an explanation, of the increases in Branch expenses, travelling expenses and staff costs.

In reply, Mr J Franks said that the increases in Branch and travelling expenses reflected the increase in the general activities of the Institute, and that a close watch was always kept on staff costs.

Mr A M Knapman said that whilst he

accepted the reasons for the increases, it would be helpful to members if more explanation was given, where appropriate, and it was agreed that this should be done in future.

Mr G Wordsworth referred to Note 3 of the Accounts dealing with investments, and felt that the present holdings of Government Securities were unbalanced. He hoped, therefore, that regular reviews would be made and, if necessary, professional advice taken.

In reply, the President appreciated the point that had been raised, and said that the General Purposes and Finance Board did, in fact, undertake regular reviews of the investment position.

There being no other comments, the motion that the Accounts of the Institute, together with the Auditor's Report for the year ended 31st December, 1981, be adopted was approved unanimously.

5. To consider and, if approved, to adopt the Accounts for the Prize Funds, together with the Auditor's Report for the year ended 31st December, 1981.

The President said that the published Accounts for the Prize Funds, had been circulated with the Report of Council. It was proposed by Mr F D Dromgoole, seconded by Mr J E Cossham, that the Accounts for the Prize Funds, together with the Auditor's Report for the year ended 31st December, 1981, be adopted and, in the absence of any comment, this proposal was carried unanimously.

6. Election of Officers of the Institute for 1982-83

The President formally declared vacant all offices of the Institute subject to election at the Annual General Meeting, namely those of the President, Vice-Presidents, Treasurer, and Executive Members of Council retiring from office. As had previously been agreed, Mr Spencer remained in the Chair until the election of the new President had been concluded.

Election of President of the Institute for 1982-83

The Chairman then announced that under the terms of Article 64, the Council had nominated as President for 1982-83, Mr R S Clarkson, FIQS, the nomination being proposed by Mr I E Wilson, seconded by Mr M H Simcock, and carried by acclamation. Mr Spencer then invested Mr Clarkson with the