

Ten Basic Factors to Identify Suitable Subcontractors for Construction Projects

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Introduction

With unpredictable workloads and a need for a multitude of specialized skills, many main contractors rely heavily on subcontracting to reduce their risks (Bresnen et al., 1985; Beardsworth et al., 1988). This is especially the case in Hong Kong, where the average direct labour content accounts for only around 1% of the total contract sum (Lai, 1987). Extensive usage of subcontracting is also reported in many other countries, including the UK (Gray and Flanagan, 1989) and Japan (Bennett et al., 1987). In addition, and depending upon the scale and complexity of works, it is not uncommon for subcontractors to further sublet their works to lower tier(s) subcontractors.

Richter and Mitchell (1982) argued that main contractors can obtain a higher profit margin by reducing their performance costs by subcontracting work to those who have the necessary resources to perform the work more efficiently and economically. Subcontracting is also used strategically to allow firms to employ a minimum work force under fluctuating demand (Usdiken and Sözen, 1985). Through subcontracting, the risks of main contractors are also reduced, as errors in estimating or additional costs caused by delays or extra labour requirements can be absorbed by the subcontractors involved (Woon and Ofori, 2000).

Despite these benefits, the quality of work can suffer when incapable or inexperienced subcontractors are employed. Additional problems also exist in the form of bid shopping, unclear accountability, and high fragmentation (Palaneeswaran et al., 2002). A recent

report produced by the Hong Kong Construction Industry Review Committee (CIRC) points to development of a framework to help distinguish between capable and incapable subcontractors (Tang, 2001). This paper describes research aims at identifying and prioritising criteria for use in such a framework.

Initiatives for Controlling Subcontractors

The general dissatisfaction with the current practice of subcontracting (Hsieh, 1998; Sözen and Küçük, 1999) has motivated the introduction of various measures aimed at enhancing the subcontractor performance. For instance, to prevent the main contractor from bid-shopping, the US listing laws require a mandatory disclosure of subcontracting firms at the time of bidding [stipulated in the California Subletting and Subcontracting Fair Practices Act (Public Contract Code Sections 4100) and Oregon Laws for Subcontractor Disclosure (ORS 279.027-2001: Chapter 507)].

In addition, some clients (e.g. Hong Kong Housing Department, Arizona Department of Transportation; Colorado Department of Transportation; US Army Corps of Engineers; and Utah Department of Transportation) impose conditions restricting the percentage of work to be sublet. Such constraints are normally imposed where the work is significantly important or where testing, supervisory or performance control is considered to be difficult.

More recently, Kumaraswamy and Mathews (2000) have proposed the adoption of partnering arrangements between main contractor and subcontractors to help manage the quality, co-ordination and scheduling of subcontracted works more effectively. Some clients, such as the MDOT (1996) and UDOT (1997), now make partnering a mandatory requirement (for contractor selection).

In response to Latham's (1994) call for improvements in the relationship between the main contractor and subcontractors, Palaneeswaran et al. (2002) have proposed the adoption of relational subcontracting as a means of optimising project outcomes. Under such an arrangement, it is necessary for the main contractor to work with subcontractors as a *team*, with emphasis on "best value" rather than "lowest price" (Australian Constructors Association, 1999).

Of course, these 'good practices' have little chance of leading to project success unless the subcontractors involved are capable of completing their tasks satisfactorily. However, with relatively easy entry into the construction market (Hegazy and Ersahin, 2001), many companies do not have sufficient capabilities to undertake the work involved (Kumaraswamy and Mathews, 2000).

Available Guidelines Related to Subcontractor Selection

To date, little research has been conducted to determine the criteria involved in the scrutiny of subcontractors. The Singaporean CSR system requires all candidates to have at least a formal organisational set up and compliance with relevant statutory requirements (Lee, 1997). Criteria developed by QBuild, Australia on the other hand, aims to evaluate the quality of work, pricing, response to quotes, response to work requested, etc. In HK, the CIRC report recommends registering those who meet the

stipulated criteria in capital, managerial and technical expertise, for direct labour only (Tang, 2001). To implement these recommendations, PCICB (2002) considers including: (i) personal data concerning key managerial or technical staff; (ii) approval for listing granted by other registration schemes; (iii) strategic partnerships with other sub-subcontractors; (iv) capital resources; and (v) all on-going and recently completed work.

An extensive web-based search was conducted to identify relevant law, procedures and practical guidelines concerning subcontractor selection. A wealth of valuable information sources were obtained from the USA - including the Arizona Department of Transport (1997), California Subletting and Subcontracting Fair Practices Act, Georgia Department of Transportation, Oregon Laws for Subcontractor Disclosure, and the US Army Corps of Engineers (Hoffman, 2000). In addition, useful information was also obtained from Australia (via QBuild), HK (via HK Housing Department), Singapore (Woon and Ofori, 2000), Turkey (Sözen and Küçük, 1999), and UK (Construction Best Practices Programme, 1999). Based on the collected documents, a list of 26 commonly used criteria for scrutinising subcontractors was compiled. As shown in Figure 1, these criteria concern the financial aspects, experience, resources, workmanship, progress, safety and design quality of subcontractors.

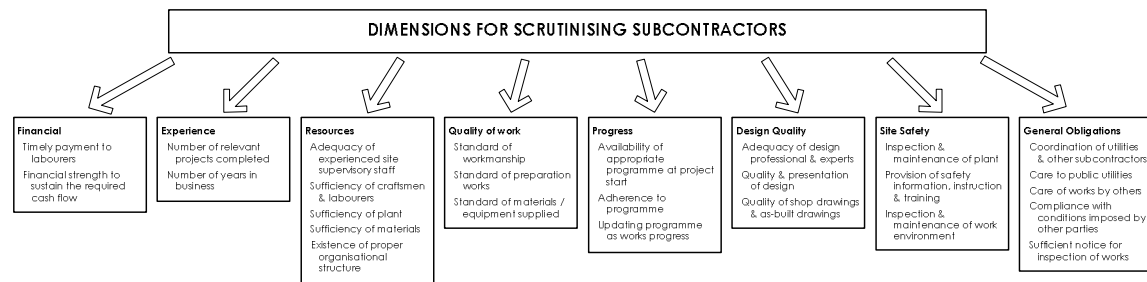


Figure 1: Criteria for scrutinising subcontractors

Research Methodology

To identify the key criteria for subcontractor scrutiny, a questionnaire survey was conducted in Hong Kong. The questionnaire consisted of two sections. The first section asked for details of the profile of the respondents, while the second focused on the respondents' perception of the importance of the 26 criteria. A five-point Likert scale was provided, with 1 representing very low importance and 5 denoting very high importance.

The questionnaire was piloted by a contract administrator, a contract adviser and a site engineer to determine whether the questions were legible, unambiguous and easy to answer. Following comments received from the experts, the questionnaire was amended before final issue.

Obviously, surveying all the organisations in the entire construction industry would yield the most representative results though hardly practicable due to amount of work and time involved. The questionnaire was therefore despatched to 135 randomly selected potential respondents. These included clients, consultants, main contractors and subcontractors. In order to improve the response rate, the respondents were first approached by telephone. The questionnaire was then hand delivered to those who agreed to participate in the study.

Out of the 135 targeted, 76 organisations returned the completed questionnaire (Table 1) representing a response rate of 56.3%. All the respondents were experienced in the local construction industry. Around 33% of the respondents had accumulated over 10 years of relevant experience in the industry, with about 46% having 6-10 years experience. The information provided by them was therefore considered to be reliable.

Table 1: Contractors' responses to the ranking of criteria for subcontractor registration

	No. of questionnaires sent	No. of questionnaires returned	Response rate
Clients/Consultants	35	28	80.0%
Contractors	50	25	50.0%
Subcontractors	50	23	46.0%
Total	135	76	56.3%

Data Analysis

The 'mean score' for the perceived importance of each of the 26 criteria was computed based on the data collected from the questionnaire survey as follows (Assaf et al., 1995):

$$MS = \frac{\sum(fxs)}{N} \quad (1 \leq MS \leq 5)$$

where: s = score, in the range of 1 to 5, given to each criterion by the respondents

f = frequency of responses to each rating (1-5), for each criterion

N = total number of responses for that criteria

The mean score and the ranking of each criterion are illustrated in Table 2. These are discussed in the next section.

Table 2: Top ten subcontractor evaluation criteria

Criteria	Client/ Consultant		Contractor		Sub- contractor		Overall	
	<i>MS</i>	<i>R</i>	<i>MS</i>	<i>R</i>	<i>MS</i>	<i>R</i>	<i>MS</i>	<i>R</i>
Financial strength to sustain the required cash flows	4.18	5	4.20	4	4.43	1	4.26	1
Adequacy of experienced site supervisory staff	4.25	2	4.20	3	4.00	4	4.16	2
Standard of workmanship	4.39	1	4.28	2	3.65	10	4.13	3
Timely payment to labourers	3.86	10	4.40	1	4.04	2	4.09	4
Adherence to programme	4.18	4	3.96	6	3.83	6	4.00	5
Number of relevant projects completed	4.21	3	3.68	9	4.00	3	3.97	6
Sufficiency of craftsmen and labourers	3.96	7	4.08	5	3.70	9	3.92	7
Provision of safety information, instruction & training	3.93	8	3.80	8	3.83	7	3.86	8
Updating programme as works progress	4.00	6	3.52	10	4.00	5	3.84	9
Sufficiency of plant	3.86	9	3.84	7	3.78	8	3.83	10

Note: MS = mean score; R = rating

Key Criteria

Financial strength to sustain the required cash flows: Among the three groups of respondents, the subcontractors ranked this criterion the highest. The obvious reason for is that subcontractors do not normally receive prompt payment from the main contractors. Of course, subcontractors need adequate cash flows to pay their workers and suppliers. The clients/consultants and contractors realise that the quality and progress of works could inevitably be affected by subcontractors' lack the funding to meet their cash commitments. This criterion can therefore be used as a filter to avoid those without sufficient financial resources being considered.

Adequacy of experienced site supervisory staff: Clients/consultants rely heavily on experienced supervisory staff to ensure the works are completed within the time, cost and quality standards. Having sufficient supervisory staff within the subcontractor's organisation could reduce the supervisory effort of the main contractor. Subcontractors gave a slightly lower ranking (ranked 4th) than the others for this as they are accustomed to relying on the directions of the clients/consultants or contractors. More importantly, extra supervisory personnel could lead to an increase in indirect costs, which may not be favoured by the subcontractors.

Standard of workmanship: For the clients/consultants, a good standard of workmanship not only increases the sell/rental value but helps to minimise on-going maintenance costs. The contractors are also aware of the importance of good quality standard as it improves goodwill and ultimately increases future job opportunities. However, bid shopping eats into the profit margin of subcontractors, and in order to survive, some cut corners by producing substandard works.

Timely payment to labourers: The contractors rank this as the most important criterion as they are concerned that labourers on site will be demoralised by delayed payments, which could result in slowed progress. As the contractors are ultimate responsible for their projects, such slow progress can affect work relationships or even give rise to liquidated damages. Subcontractors are under the contractual obligations to pay their labourers on time, and they therefore also rated this criterion highly too (ranked 2nd).

Adherence to programme: Work progress is a key concern of clients/consultants as delays can have serious consequences. For instance, a private development that cannot be completed within the anticipated schedule increases the financial burden on the client in the form of extra interest payments. The contractors and subcontractors also consider this criterion very important, as it involves cash flow problems and the possibility of liquidated damages or penalties.

Number of relevant projects completed: Many clients/consultants, including local government, are actively considering the possibility of including other factors such as experience and safety records in their tender evaluation process. For similar reasons, the clients/consultants accord a high priority to this criterion. The subcontractors also place a high priority on the relevant experience, as they are providing their service based on their specialised skills. The contractors, however, do not perceive this criterion to be as important as do the others since they tend to favour employing those with whom they have a long-term work relationship.

Sufficiency of craftsmen and labourers: The number of craftsmen and labourers provided by the subcontractor directly affects the progress of the work. Since the

contractors have the contractual responsibility to complete within the stipulated time, they like to see their subcontractors with sufficient human resources to carry out the subcontract tasks. Among the three groups of respondents, the subcontractors placed less emphasis on this criterion, as this not only would increase their direct costs but excessive recruitment could also reduce their flexibility if their workload diminishes.

Provision of safety information, instruction and training: Site safety has attracted much attention over the last two decades. All parties realise the importance of site safety and its relationship with the quality and progress of the work. The accident rates in Hong Kong are relatively high compared with other industrialised countries such as Japan. This may be partly due to subcontractors hiring unqualified or inexperienced workers,

Updating programme as works progress: It is not surprising to find the subcontractors according a high priority to this criterion, as they need to effectively deploy their resources to accomplish their tasks. Clients/consultants also like to update the programme as the works progress, as it facilitates the monitor and control of their projects. However, the updated programmes would not be available unless the main contractors are prepared to update them regularly. Interestingly, the contractors pay relatively lower attention to this criterion than the other two groups, as the updating of programme is often a quite tedious task.

Sufficiency of plant: Having the necessary plant would help the subcontractors to complete the work efficiently. However, since most of the major plant is provided by the main contractors, the plant provided by the subcontractors is limited to those required for specialised applications, such as asbestos removal.

Conclusions

This paper reports the results of a survey conducted in Hong Kong to examine the importance of criteria for scrutinizing subcontractors. A close examination of the top ten criteria indicates that the rankings given by the clients/consultants, contractors and subcontractors groups are slightly different. This could be due to a disparity in the interests of these three groups of project participants. The clients/consultants are more interested in quality enhancement while the contractors focus more on reducing their contractual risks. As for the subcontractors, a set of rigorous evaluation criteria could help eliminate incompetent competitors and hence increase their own competitiveness.

The ten most important criteria for scrutinising subcontractors were found to be “financial strength to sustain the required cash flows”; “adequacy of experienced site supervisory staff”; “standard of workmanship”; “timely payment to labourers”; “adherence to programme”; “number of relevant projects completed”; “sufficiency of craftsmen and labourers”; “provision of safety information, instruction and training”; “updating programme as works progress”; and “sufficiency of plant”. Further studies need be carried out to examine the relationship between these factors, and how these criteria may be objectively evaluated to minimise any bias or unfairness.

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