

# ORGANISATION OF SITE MANAGEMENT FOR BUILDING PROJECTS - A REVIEW

by

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## Abstract

Management of present day construction projects is becoming increasingly complex and challenging due to many reasons. To meet these challenges it is important that the contractors adopt an effective, efficient and flexible site management structure with qualified people at key management positions. This paper presents the details of a study carried out to investigate the types of site structures formed; factors considered in forming site structures; division of work; and assignment of roles, responsibilities and authorities as an attempt to review the present practice. The study is based on 18 Grade I contractors and 11 Grade II contractors covering 36 construction sites.

The results show that all the contractors adopt a partly centralised site management system and form project structures which possess many characteristics of a functional management structure. Complexity and site layout, project cost, capabilities of personnel and type of finishes were found to be the most important factors considered when forming a site management team. The study further indicates that no systematic procedures are adopted in the division of work, assignment of roles, responsibilities and authorities to site staff.

## 1.0 Introduction

The modern day clients' complex and intricate requirements, rapid improvements in technology and the competitive environment in the construction industry have compelled the contractors to make use of their resources most economically while executing works on site. Effective site management is not an easy task. This is because the site managers often have to make many quick decisions based on their personal knowledge and experience due to the requirement of large number of inputs to a construction site, the fact that each project is one-off operation exposed to the vagaries of weather, the difficulties of managing a large number of men possibly working together for the first time and the diversity of conditions from one site to the other.

Poor management is reflected in increase in costs of various inputs to the construction process. Cost of

materials can rise due to wastage resulting from poor storage, lack of care, double handling, unsuitable transport methods and wastage during usage due to poor supervision. Cost of labour can rise due to low productivity, poor workmanship necessitating rectification and loss of time due to inadequate planning. The cost of plant and equipment can rise due to low utilisation and inadequate maintenance. Thus, to face the above challenges it is of paramount importance that the contractor adopts an effective, efficient and flexible site management team with suitable personnel at key management positions.

Experience in the Sri Lankan industry shows that a considerable number of construction sites are not properly organised both in management structures and in implementing various project control techniques resulting in programme delays and cost overruns. Thus, a study was carried out to investigate (a) the ways in which site management structures are formed by Sri Lankan contractors, (b) factors considered in forming site management structures, (c) the procedures adopted in assignment of roles, responsibilities and authorities, (d) the qualifications and skills required for various key positions, (e) the extent of measures taken for project control, and (f) to identify various site and site office routines and personnel responsible for those routines. This paper presents the details and the results of the first four aspects of this study. Those of the last two aspects are given in a sister paper (Jayawardane and Srikumaran 1997).

## 2.0 Methodology and Data Collection

Theories of organisation and management have been revealed by many writers in many fields but organisation and management of a construction site is signifi-

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cantly different from steady state businesses like production factories and hospitals (Seeley 1993). However, there is a great deal of overlap between general organisation and management, and site management. Thus, first, a thorough literature survey was carried out in areas of principles of organisation, types of organisational structures, organisation tools and techniques, and site organisation and management as a background to the study.

Second, interviews and discussions were carried out with higher management in construction organisations and construction sites. This method was selected as the most suitable for field data collection because it enables to have interactive discussions to obtain detail explanations and justifications for various opinions and decisions, provides a 100% response rate and an opportunity to collect further information such as organisation charts and related data.

The emphasis was given to Grade I contractors since they have the necessary know-how and expertise for effective site management which can then be used to test the industry status. However, it was thought appropriate to cover a sample of Grade II contractors as

well to establish whether there are any similarities and variations between the two grades.

The sample included all Grade I contractors, a sample of Grade II contractors and a representative sample of their sites. The extent of coverage was limited to the Western Province since a very big proportion of Grade I and II contractors and their sites are based in the Western Province and also by considering the difficulties in covering the outstation contractors and sites.

After a pilot survey carried out with three Grade I construction managers prior to finalising the questionnaire, a well structured interview questionnaire was adopted for data collection so as not to miss any essential information and to avoid unnecessary details. In order to make sure that sufficient and necessary data are collected through discussions to fulfil the study objectives, a pilot data analysis was carried out after interviewing 5 Grade I contractors. Subsequently, the necessary improvements were incorporated to the final questionnaire. This way, 18 Grade I contractors, 11 Grade II contractors, and 36 building sites were studied in the data collection. The details are given in Table 1.

**Table 1**  
**Details of the contractors and sites used in the study**

| Contractor No: | Grade | Sector  | Type of building | Approximate Cost (Rs. m) |
|----------------|-------|---------|------------------|--------------------------|
| 1              | I     | Private | Hotel            | 200                      |
| 2              | I     | Private | Institution      | 80                       |
| 3              | I     | Private | Housing          | 90                       |
| 4              | I     | Private | Institution      | 25                       |
| 5              | I     | Private | Hotel            | 250                      |
| 6              | I     | Private | Housing          | 80                       |
| 7              | I     | Private | Housing          | 70                       |
| 8              | I     | Private | Office           | 45                       |
| 9              | I     | Private | Hospital         | 50                       |
| 10             | I     | Private | Office           | 35                       |
| 11             | I     | Private | Office           | 65                       |
| 12             | I     | State   | Office           | 40                       |
| 13             | I     | State   | Housing          | 75                       |
| 14             | I     | Private | Housing          | 60                       |
| 15             | I     | Private | Office           | 30                       |
| 16             | I     | Private | Shopg. Complex   | 25                       |
| 17             | I     | Private | Office           | 20                       |
| 18             | I     | Private | Factory          | 9                        |
| 19             | I     | Private | Office           | 35                       |
| 20             | I     | Private | Housing          | 45                       |
| 21             | I     | Private | Housing          | 40                       |
| 22             | I     | Private | Factory          | 6                        |
| 23             | I     | Private | Office           | 20                       |
| 24             | I     | Private | Office           | 25                       |
| 25             | I     | Private | Office           | 30                       |
| 26             | II    | Private | Housing          | 65                       |
| 27             | II    | Private | Hotel            | 40                       |
| 28             | II    | Private | Office           | 15                       |
| 29             | II    | Private | Housing          | 25                       |
| 30             | II    | Private | Hospital         | 20                       |
| 31             | II    | Private | Hotel            | 25                       |
| 32             | II    | Private | Office           | 20                       |
| 33             | II    | Private | Shopg. Complex   | 28                       |
| 34             | II    | Private | Office           | 24                       |
| 35             | II    | Private | Factory          | 4                        |
| 36             | II    | Private | Factory          | 8                        |

Third, the data were compiled and statistically analysed to fulfil the objectives.

### 3.0 Results and Observation

#### 3.1 Possible types of site management structures

Like any other management structure, site management structure presents the division of site activities, functions and responsibilities with the help of an organisation chart. This chart with various tiers shows the positions of site staff in the structure in a hierarchical order.

An organisation has several options when choosing a project structure. One may choose to utilise normal functional channels with each functional manager responsible for a segment of the project and then rely on the organisational hierarchy to co-ordinate the segments. At the other extreme, a team of experts may be pulled from relevant functional areas to work together on just one project and formally report only to a project manager. As an intermediate approach some kind of matrix structure might be used in which a project manager shares authority with functional managers in co-ordinating across functional areas (Freeman and Stoner 1992). Each approach has its own strengths and weaknesses and the type of structure chosen will significantly affect the success of a project. This way, the possible types of site management structures can be categorised in to the following as recommended by Freeman and Stoner (1992).

##### (a) Functional Structure:

This is the classic organisation with separate departments, divisions or work groups each having members similar or clearly related disciplines or functions. Examples include construction division, design division, architectural division, plant division, accounts division etc. in an engineering organisation. In a contractor organisation, these functional divisions may be planning, estimating, supplies, finance, quantity surveying, plant, construction, and even work study. In the functional structure, the functional managers and the management hierarchy, rather than the formally designated project manager, co-ordinate the various activities.

##### (b) Functional Matrix Structure:

This is a project structure that has a formally designated project manager with limited authority and is a cross between functional and matrix management. Here, a project manager formally exists but his role is restricted to planning and

scheduling rather than having responsibility for completion of work.

##### (c) Balance Matrix Structure:

This is a pure matrix form with a balance of power between functional managers and the project manager. The project manager shares authority with functional managers on nearly equal basis.

##### (d) Project Matrix Structure:

This allows the project manager a strong role. The project manager is assigned to oversee the project and has primary responsibility and authority for completing the project. Functional managers provide technical expertise.

##### (e) Project Team Structure:

This does not provide for any formal involvement of functional managers. A project manager is put in charge for project team composed of a core group of personnel from several functional areas assigned on full time basis. Although the project team members refer to functional managers for advice or even sharing of some special resources in a matrix manner the project team itself has at least a core group of members that can get the bulk of the work done.

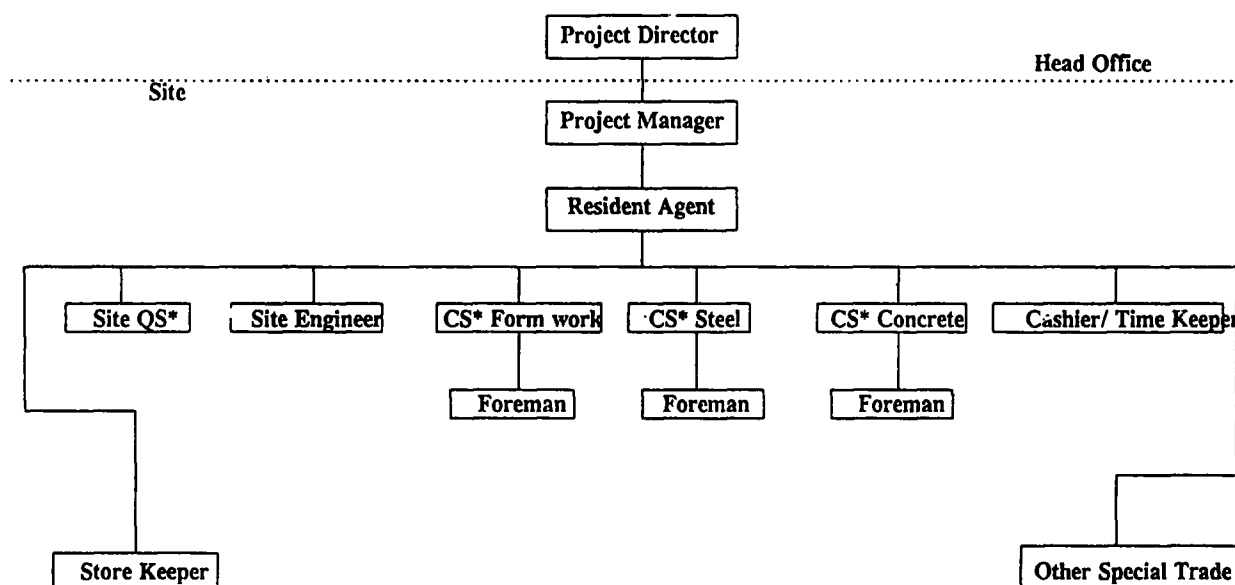
The above types provide a sensible classification within the two extremes of site management's dependence on the organisational functional hierarchy. However, it is difficult to identify the exact type of site management structure only by looking at a particular site organisation chart. To do this, it is necessary to investigate how various functional requirements of the site are carried out in addition. It should also be noted that it is not possible to provide strict guidelines as how to do this but what is required is a reasonable judgement based on facts.

#### 3.2 Characteristics of site management structures used in Sri Lanka

Twenty five site management structures formed by 18 Grade I contractors and 11 structures formed by 11 Grade II contractors were carefully analysed to find out their characteristics and management procedures. The findings are summarised below.

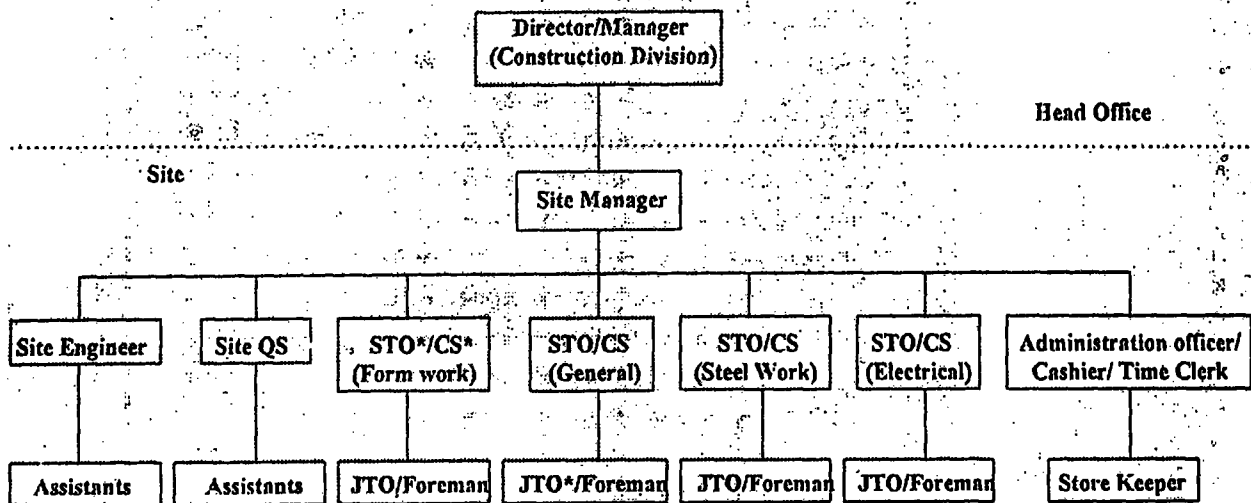
- (a) Maximum 4 tiers and minimum 3 tiers exist in site management structures formed by Grade I contractors for medium-large projects. However, the majority of Grade I contractors form 3 tier structures. Those of Grade II contractors are generally of 3 tiers.

- (b) There are lot of similarities among the site management structures formed by Grade I and II contractors and that they are significantly different depending on the project size. Typical structures formed by Grade I contractors for different project sizes are shown in Figures 1-3.
- (c) Except for a few, all site personnel belong to one functional group in the contractor organisation which is referred to by several names such as construction group, construction division or project division.
- (d) The site head of large projects handled by Grade I contractors is generally called "Project Manager" or "Site Manager". The designation mainly depends on the qualifications of the person and the limit of executive authority vested. The limit of authority generally depends on the site location since more responsibility and authority are vested to site heads of outstation projects in order to avoid delays in decision making. "Site Manager", "Resident Agent" "Officer in charge" are designations given to site head of medium and small projects by Grade I contractors.
- (e) All 4 tier structures formed by Grade I contractors have "Project Manager" in the first tier and "Resident Agent" in the second tier. Three tier structures are generally headed by "Site Manager".
- (f) The 2nd tier of 3 tire structure and 3rd tier of 4 tire structure have several divisions. These divisions may be based on the specialised trades such as carpentry(form work), steel work (rebar) and masonry (finishes). The division heads are called Site Engineer, Assistant Engineer, Senior Technical Officer or Construction Superintendent depending on the qualifications and experience.
- (g) Last tier of management structure generally include supervisory personnel such as foremen or junior technical officers.
- (h) Site management structures used for medium projects (Rs. 35-50m) are similar to those of large projects (over Rs. 50m) but with minor changes.
- (i) All construction sites are partially centralised. All Grade I contractors surveyed firmly believe that general matters such as finance and accounting, personnel management, purchase and supplies etc. are most conveniently handled by functional groups in the head office along with relevant professional project oriented staff. The present practice indicate that the degree of decentralisation is similar among contractors although their petty cash limits, site purchases can significantly vary between them.
- (j) Out of all t{U siwçs surveyed under Grade I contractors, 78% of the sites are linked to head office by a Director/Manager operating from head office making frequent visits to sites under him. About 17% of the sites are linked to head office by a frequent reporting to Director/Manager by



- \* 1. QS - Quantity Surveyor  
\* 2. CS - Construction Superintendent

Figure 1 - Typical 4 tier site management structure used by Grade I contractors for medium-large projects.

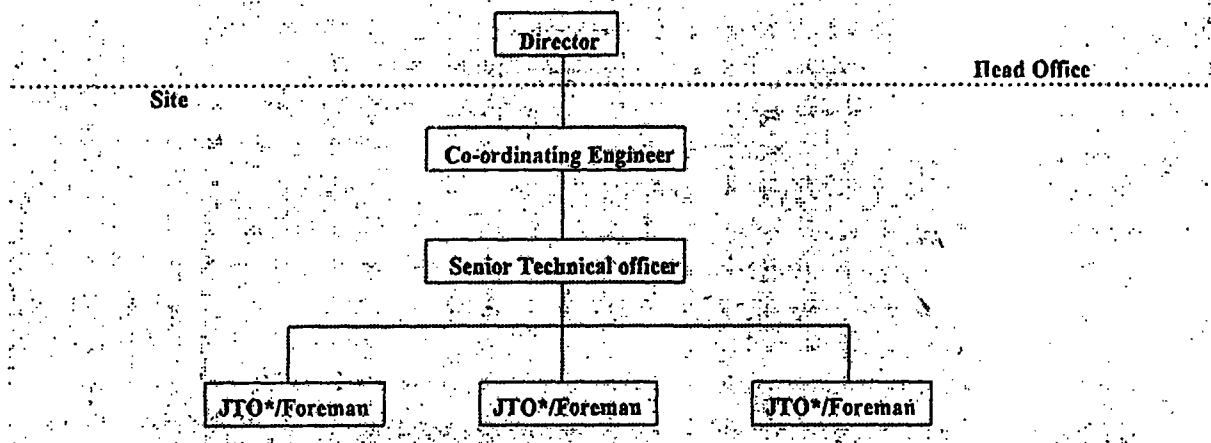


\*CS - Construction Superintendent

\*STO - Senior Technical Officer

\*JTO - Junior Technical Officer

Figure 2 - Typical 3 tier site management structure used by Grade 1 contractors for medium-large projects.



\*J. JTO- Junior Technical Officer

Figure 3 - Typical site management structure used by Grade I contractors for small projects.

his representative attached to a particular site who is generally the site head. Only 5% of the site had co-ordinating engineers operating from head office and directly responsible to Managing Director of the organisation.

- (k) Generally no attempt is made by the contractors to change the site structure or the site head during the project execution. However, there are situations where persons having experience in structural work are deployed at site at the commencement of projects and some of them are replaced by persons experienced in finishing work when the project approaches to finishing stage.

The aforementioned findings indicate that the site management structures adopted by the major contractors are more or less similar to the functional group structure where functional managers are responsible for a segment of work, and co-ordination through functional channels rely on the organisational hierarchy. This is further evident since their site management structures (Figs. 1-3) do not have specific functional staff for functions like planning & control, supplies, plant & equipment, and so forth indicating that site management obtain services of the functional managers at the head office for these matters. This feature is in fact quite different to site management practise in the USA and Canada where the project matrix structure had the highest incidence rating (90%) of any other type of structure and in fact the functional structure received the lowest rating (40%) (Gobeli and Larson 1987).

### 3.3 Factors influencing the formation of site management structure

From the literature and discussions with the contraction professionals the factors which mainly influence the formation of site management structure were identified as follows.

- (a) The estimated project cost (project size).

- (b) Complexity and site layout : Complexity means many specialised activities which require close supervision, co-ordination and expert knowledge. Site layout will depend on the availability of site access, site limits, number of blocks/structures and their lay out .

- (c) Type of finishes: Vary according to the function of the structure such as hotels, institutions, offices and housing flats.

- (d) Capability of personnel: Refers to those having pervious experience and knowledge of similar projects and were recognised for their commendable service.

- (e) Consultant/Client: Refers to the congeniality and characteristics of consultant/client and relationship of the client to the contractor.

- (f) Project duration.

- (g) Procurement method.

In order to examine the most critical factors considered when forming site management structures, construction managers were asked to rank the above factors from the most important. The results are summarised in Tables 2 and 3.

From the results in Tables 2 and 3 it is clear that complexity and site layout, estimated project cost (project size), and type of finishes and capabilities of personnel, are the most important factors considered by contractors in forming site management structures. It is also interesting to note that procurement method, characteristics of consultant/client, type and number of activities are relatively unimportant.

### 3.4 Present practice of division of work and assignment of roles and responsibilities

Clearly, it is not possible to exactly divide each element of site work and assign responsibilities among

**Table 2**  
**Significance of factors considered by Grade I contractors**

| Factor                                      | Rank |    |    |    |    |
|---------------------------------------------|------|----|----|----|----|
|                                             | 1    | 2  | 3  | 4  | 5  |
| Complexity and site layout                  | 56   | 33 | 11 | -  | -  |
| Project cost                                | 28   | 22 | 33 | 11 | 11 |
| Type of finishes and capabilities of people | 17   | 28 | 39 | 11 | -  |
| Procurement method                          | -    | 5  | -  | 16 | -  |
| Consultant/Client                           | -    | -  | -  | 16 | 11 |
| Project duration                            | -    | 11 | 11 | 44 | 33 |
| Type and number of activities               | -    | -  | 5  | -  | 44 |

**Table 3**  
**Significance of factors considered by**  
**Grade II contractors**

| Factor                                      | Rank |    |    |    |    |
|---------------------------------------------|------|----|----|----|----|
|                                             | 1    | 2  | 3  | 4  | 5  |
| Complexity and site layout                  | 45   | 27 | 27 | -  | -  |
| Project cost                                | 18   | 27 | 18 | 36 | -  |
| Type of finishes and capabilities of people | 36   | 46 | 18 | -  | -  |
| Procurement method                          | -    | -  | -  | -  | -  |
| Consultant/Client                           | -    | -  | -  | 37 | 45 |
| Project duration                            | -    | -  | 37 | 27 | 36 |
| Type and number of activities               | -    | -  | -  | -  | 18 |

various site personnel due to the fact that each project is a one-off operation involving many different activities and uncertain factors. However, the site work can be generally divided in to two, namely, Administrative and Technical. The present practice of assignment of duties and responsibilities for each key personnel are as follows.

- (a) **Project Manager** : The title "Project Manager" seems to be a confusing title in the Sri Lanka construction industry too. It is used for contractor's site head by 4 out of 18 Grade I contractors. There are situations where, the Project Manager is not necessarily be the in charge for one site but can control several sites depending on size and location of projects. When the Project Manager is stationed and in charge for one site he is generally referred to as "Resident Project Manager". In addition to the usage of the title Project Manager in this context, it is also used for managers who represent the client and co-ordinate work between parties. This practice is becoming increasingly popular in the Sri Lankan industry.

The contractor's project manager is generally responsible for overall administration of site involving personnel management, weekly programming, directing Resident Agent, dealing with special and nominated sub contractors, co-ordination with consultants/clients, financial matters, submission of monthly bills and follow up activities. He has authority for certification of all correspondence to head office, allocation of tasks and duties for site staff, certification of payments and purchase approval within his limits.

- (b) **Site Manager**: The title "Site Manager" is used for the site head when the site management structure is of 3 tiers. He has similar authority and responsibility as the project manager described above.
- (c) **Resident Agent** : The title "Resident Agent" is generally used by Grade I contractors who adopt

4 tier management structure which is headed by a project manager. The Resident Agent is at the second tier. His responsibility generally involves ordering materials in time, detail planning of activities, stores management, co-ordination of sub contractors, preparation of bills, accounting work and directing subordinates. He has authority to certify purchase requests, material requests, sub contractors' bills and suppliers' bills; and carry out periodic stores checks and take necessary actions. In addition, he is expected to assist the project manager in every aspect of the project work.

- (d) **Site Engineer** : Site Engineer is at the 2nd level of 3 tier structure or 3rd level of 4 tier structure. He is generally responsible for technical work at site such as quality control; setting out survey and levelling work; study of drawings, preparation of shop drawing and bar bending schedules; technical advice to subordinates; and general supervision of work.
- (e) **Site Quantity Surveyor** : Site Quantity Surveyor is usually at the same level as the site engineer. His responsibilities involve taking site measurements; preparation of monthly bills, extra work claims, sub contractors' payments, and cash flows; carrying out cost monitoring and checking quantity variations; and sometimes general contract administration at site.

It is also interesting to note how the above roles, responsibilities and authorities are communicated to various site management staff. It was found that 100% of the contractors adopt verbal communication, 55% through informal meetings, 35% through organisational chart, 13% through formal meetings and none through job description statement.

### 3.5 Qualifications and skills required for various key personnel

Typical qualifications and skills required for key site personnel of Grade I and II contractors are shown in Table 4. It should be noted that the title Project Manager referred in this Table is in the context of the contractor's project manager.

## 4.0 Discussion

- Although the findings of the study indicate that several factors are considered in forming a site management structure for a project, it was not possible to find out how these factors are evaluated and incorporated during the process. In fact, what usually happens is that the contractors tend to adopt a similar site management structure for

**Table 4**  
**Qualifications and skills required for various key personnel**

| Title                                | No. of tiers | % of contractors | Qualifications expected*        | Experience required                                             | Skills required                              |
|--------------------------------------|--------------|------------------|---------------------------------|-----------------------------------------------------------------|----------------------------------------------|
| Project Manager                      | 4            | 17               | BSc Eng/ equivalent             | Over 10 years in the field.                                     | Leadership, managerial and communication.    |
| Site Manager                         | 3            | 83               | BSc Eng/ NDT/ NDES/ NCT         | Over 5 years . for BSc Eng and 10 years for others in the field | Leadership, managerial and public relations  |
| Resident Agent                       | 4            | 17               | BSc Eng/NDT                     | 3-5 years in the field.                                         | Managerial capability.                       |
| Site Engineer                        | 3,4          | 100              | BSc Eng/ equivalent             | 1-2 years.                                                      | Rich in technical knowledge and application. |
| Construction Superintendent/ Snr. TO | 3,4          | 100              | NDT/NDES/ NCT                   | Over 5 years.                                                   | Practical knowledge.                         |
| Foreman/ Jnr. TO                     | 3,4          | 100              | Minimum technical qualification | over 10-15 years in the field.                                  | Labour control.                              |

\* NDT - National Diploma in Technology  
NDES - National Diploma in Engineering Science  
NCT - National Certificate in Technology

almost all the projects of similar size, perhaps with very few modifications usually decided by intuition of the contractor. General improvement of the site management structure based on site feed back does not seem to be taking place for subsequent projects. One way to overcome this is to follow a methodical approach to form the site management structure for a project based on a set of guidelines. Table 5 shows one such set of guidelines. However, improvements should be made to these guidelines based on feedback from completed projects and experience with similar work both local and international.

2. The study indicates that only a fraction of Grade I contractors appoint site managers well before the actual construction and consult him in designing site management structure and identifying site key personnel. This is in fact a very unsatisfactory situation where site managers blindly take up sites and carry on. This is evident from the fact that more than 50% of the construction managers could not provide any suggestions for improvement and claimed that they are satisfied with the existing set up. However, the rest indicated that the present set up does not provide for

effective planning and control procedures which is far from satisfactory for most projects (Jayawardane and Srikumaran 1997). A recommended site management structure incorporating planning and control as an important aspect is shown in Figure 4 which was developed based on literature and feed back from practitioners.

3. It was also interesting to note that the site management structures given by the construction managers at the head office are those given to the consultants to satisfy contractual obligations, and very often, they do not tally with the ones adopted at sites. The consultants usually monitor and influence the formation of site management structure, in particular, the qualifications of site personnel at the tender stage but they are not concerned and regulate this during construction. Further study should be carried out to establish the gravity of this problem and formulate recommendations to overcome same.
4. Most construction managers found it difficult to explain how roles and responsibilities are divided among site staff and how they are communicated to them. Further, it was still more difficult for

**Table 5**  
**Specimen guidelines for formation of site management structures**

|        |                                                                          |                                                                                                                                                                                                                                                                                                                 |
|--------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step 1 | Identify the work involved<br>(To know what to do)                       | <ul style="list-style-type: none"> <li>- Site layout</li> <li>- Project duration</li> <li>- Type of project</li> <li>- Scope of work</li> <li>- Any similar past projects</li> <li>- Location of site</li> <li>- Type of foundation</li> <li>- Quality standard required</li> <li>- Control measures</li> </ul> |
| Step 2 | Plan the resources<br>(To know the exact number of management personnel) | <ul style="list-style-type: none"> <li>- Tentative organisation structure</li> <li>- Available resources</li> <li>- Overhead allocated</li> <li>- Who will be involved at start</li> <li>- Probable changes</li> <li>- Assign duties</li> </ul>                                                                 |
| Step 3 | Form work groups                                                         | <ul style="list-style-type: none"> <li>- Develop participation</li> <li>- Field work team</li> <li>- Planning and control team</li> <li>- Administration group</li> <li>- Welfare group</li> </ul>                                                                                                              |
| Step 4 | Put the groups to work as required                                       | <ul style="list-style-type: none"> <li>- Set job design</li> <li>- Set rules, procedures</li> <li>- Set time frame for records</li> </ul>                                                                                                                                                                       |
| Step 5 | Evaluation & assess results                                              | <ul style="list-style-type: none"> <li>- Continuous evaluation</li> <li>- Re-allocation of work</li> </ul>                                                                                                                                                                                                      |
| Step 6 | Change according to evaluation                                           | <ul style="list-style-type: none"> <li>- Re-engineering</li> <li>- Replacement of site personnel</li> </ul>                                                                                                                                                                                                     |

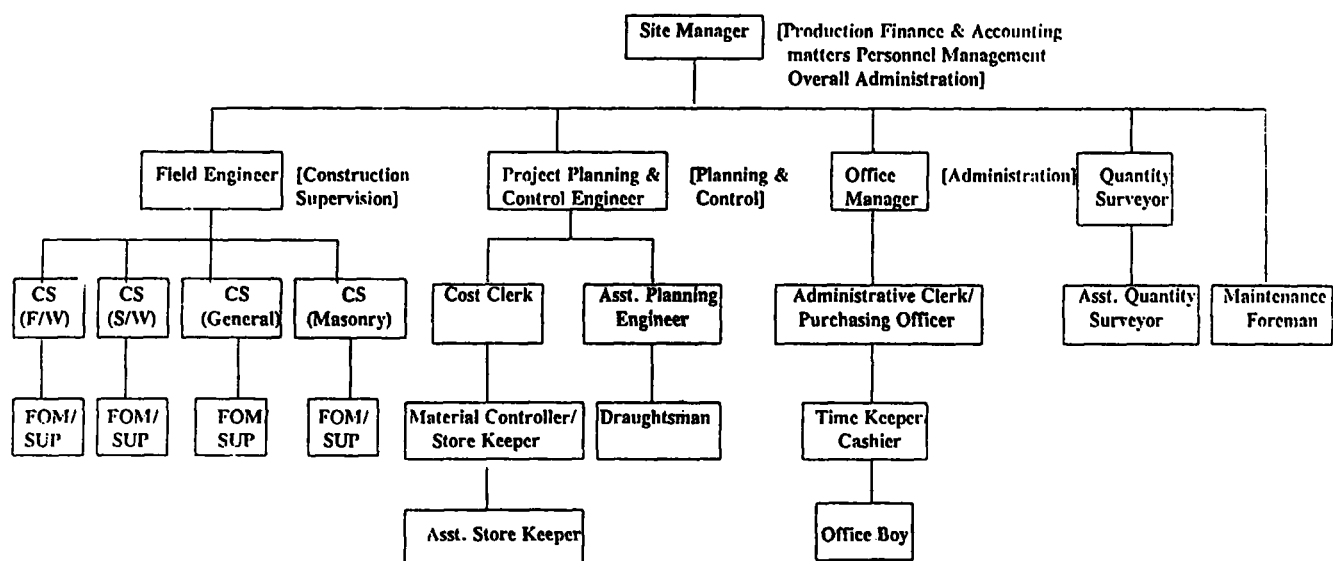
them to explain what authorities are vested to site head and what more to be given. Although some contractors raised objections for the use of manuals and job descriptions, many successful foreign contractors operating in Sri Lanka make use of them because manuals provide quick reference to urgent problems on site while job descriptions provide clear division of work to ensure higher quality and productivity. Further study is recommended to look into this aspect.

5. One question that the reader will have is "What is the best type of management structure for a given project?" If the project is small with no complications the best type is the functional type. This is because, site management do not require managerial staff dedicated to specific functions such as planning & control, supplies, quantity surveying and so forth for small projects. If they are employed they will be very much under-utilised. These aspects are often looked after by the site head himself with the assistance of his supporting staff. In situations where this is not possible he can simply obtain the services of functional divisions of the organisation. One disadvantage

of this arrangement is that the functional divisions might not take prompt action since such requests are among many others received from different projects. However, it is far more economical than having under-utilised staff dedicated to specific projects.

The recommended structure for a large project on the other hand is the project team structure. There are several reasons for this. First, large projects require full time services of functional staff. Second, these functional staff work more efficiently when they are dedicated to a project. Third, if they are dedicated to a project then it is still more efficient to attach them to site management making them directly responsible to the project manager.

The guideline is that if there is any function in the project which requires full time services then the relevant full time staff should be released from the head office and attached to the site management structure. For other functions, the project manager should obtain services of functional divisions of the head office. Depending on the way the balance tips the type of the structure will vary between the two extremes - functional and the project team.



1. CS - Construction Superintendent
2. F/W - Form Work
3. S/W - Steel Work
4. FOM - Foreman
5. SUP - Supervisor

Figure 4 - Proposed site management structure for medium-large projects

There is no reason why the type of structure should vary depending on the type of construction but what matters is the amount of services required from different functional groups. However, the type of structure should not be confused with the consistency, the latter can vary depending on the type of construction. The reason for adopting site management structures similar to functional type by our contractors even for large projects (without dedicated staff for planning & control etc.) seems to be the lack of concern on their full time requirement. Although the contractors do this to cut down site overheads, this is one of the main reasons for programme delays and cost overruns.

## 5.0 Concluding Remarks

The findings of the study indicate that present practice of forming site management structures, identification of suitable personnel, and assignment of roles, responsibilities and authorities can be considerably improved to enhance site productivity. Some of the recommendations outlined in this paper can be used as a starting point towards this exercise. The contractors should be mindful for the fact that the construction industry world-wide is increasingly under pressure to incorporate quality assurance systems which compel

the contractors to shed the inefficiencies and re-engineer their organisations and sites to face this global challenge in order to survive in the industry.

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