Contents lists available at

Journal of Environmental Management and Safety

Journal homepage: www.cepajournal.com

Construction Management: A Tool for a Sustainable Peace and Conflict Resolution in the Building Industry.

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ARTICLE INFO

Article history
Received 12 February 2010
Received in revised form 23 February 2010
Accepted 14 March 2010
Available online 30 April, 2012

Keywords:

Construction Management, Sustainable Peace, Conflict Resolution, Building Industry.

ABSTRACT

This paper focused attention on how the content and nature of study of Construction Management would be used to create harmonious environment in a Construction Site, free of the usual rancor and acrimony of human nature. It examined the operations of these Professionals, Supervisors and Crafts Men with a view to realizing the Goals of Construction Management, which is both Social and Technical. The analysis of the future for Construction Management showed that the integration demanded of the industry is at both emotional and operational levels. The ability to coordinate several major activities at once, while analyzing and resolving specific problems, is essential for Construction Management, as is an understanding of Engineering, Architectural, and other Construction Management Drawings. The Environment and Man that lives in it act systematically with Man as the one in control of the system. He can therefore choose to maintain a balance to this set of interconnected things or parts, to achieve unity, or live with confusion. It therefore becomes imperative that these diverse disciplines and multitude of People must be managed and harmonized in order to optimize the resources available for the benefit of society, in realizing the building project, within the constraints of Function, Time and Cost. That is the basic premise of Construction Economics, Management of Man, Material and Money.

1.0.INTRODUCTION

A construction project is a highly emotional place. It is typically a temporary gathering of an average of two hundred people, who come together from various places, for parts of about eighteen months, to assemble and install the products of several manufacturers. Those manufacturers are generally larger and often somewhat indifferent to the firms to which they are selling their products. The firms or on-site contractors that actually convert the plans and specifications into a finished project, usually average about fifteen in number. Some of the fifteen will be the leaders in their trade, and some will be marginal, even insolvent. Every type of person will show up at the job site. Contrary to all the contract requirements in force on the project, communication at the job site is essentially done on an oral basis. The most successful jobs are those that are set up with as few tiers of vertical hierarchy as possible. The job site conversation will loop around the project. Discussions and directions will emanate from the person in charge of the field. Someone will leave the job office and give a direction, a huddle will occur, and the one in charge of the work will write out his idea on a lunch bag, piece of sheet rock, lumber or some other handy transportable surface that will take a mark. Someone will round up a truck, crane, dolly, wheel barrow, and so on, and then forage for what is needed, and the work will get done. Communication at the site is verbal. No matter how complicated or technological the design may be, its installation must be first turned into spoken, instructional words to people who are not paper oriented. The typical mechanic has no time for paper. Many cannot read plans, none can read specifications and all of them regard the man with the necktie from any office with distrust (Hohns, Murray h. 1981).

2.0.TYPES OF CONSTRUCTION MANAGEMENT SYSTEMS

There are two major management systems used for projects: the general contractor system, and the construction management system. In the general contractor system, the owner hires a general contractor to manage all activities (also known as turnkey projects). Working for the general contractor, construction managers oversee the completion of all construction in accordance with the engineer's and architect's drawings and specifications and prevailing building codes. They arrange for trade contractors to perform specialized craftwork or other specified construction work. On small projects such as remodeling a home, self employed and construction manager or skilled trade worker who directs and oversees employees often is referred to as the construction "contractor". In the construction management system, the owner hires a firm to oversee all aspects of the project. The management firm will then hire a general contractor to run the construction process and oversee construction of the structure. The manor difference from the general contractor system is that the hired management

firm, rather than the owner, works with the individual construction manager. In the design build system, the owners, architects, general contractors and major subcontractors are brought together to cooperatively plan and design the project. The design build group may be from an individual firm or a conglomeration of separate entities. The construction manager participates during the design process and may be in charge of the construction project one the design is agreed upon. Construction manager may be owners or salaried employees of a construction management or contracting firm, or may work under contract or as a salaried employee of the owner, developer, contractor, or management firm overseeing the construction project. There are different types of construction management contracts. The type of tendering method adopted by the client/architect influences these contracts. The tendering may by an open tender, which have the advantage of allowing a lot of interested firms, or selective tendering, where a list of firms are invited to bid (Harris, F. and McCaffer, R. 2001).

THE TYPES OF CONSTRUCTION MANAGEMENT CONTRACTS:

- Negotiated Contracts
- Lump Sum Contract
- Contract With Price Variation
- Package Deal

2.1. NEGOTIATED CONTRACTS

Instead of inviting competitive bidding, private owners often choose to award construction contracts with one or more selected contractors. A major reason for using negotiated contracts is the flexibility of this type of pricing arrangement, particularly for projects of large size and great complexity or for projects, which substantially duplicate previous facilities sponsored by the owner. An owner may value the expertise and integrity of a particular contractor who has a good reputation or has worked successfully for the owner in the past. If it becomes necessary to meet a deadline for completion of the project, the construction of a project may proceed without waiting for the completion of the detailed plans and specifications with a contractor that the owner can trust. However, the owner's staff must be highly knowledgeable and competent in evaluating contractor proposals and monitoring subsequent performance. The fixed percentage of fixed fee is determined at the outset of the project, while variable fee and target estimates are used as an incentive to reduce costs by sharing any cost savings. A guaranteed maximum cost arrangement imposes a penalty on a contractor for cost overrun s and failure to complete the project on time. With a guaranteed maximum price contract, amounts below the maximum are typically shared between the owner and the contractor, while the contractor is responsible for costs above the maximum. Generally, negotiated contracts require the reimbursement of direct project cost plus the contractor's fee as determined by one of the following methods:

1. Cost plus fixed percentage

2. Cost plus fixed fee
3. Cost plus variable fee
4. Target estimate
5. Guaranteed maximum price or cost

Cost Plus Fixed Fee

After calculations, using the rates for materials, labour and subcontract, a fixed fee is added and agreed on.

Cost Plus Contract

In this mode, after using the schedules of rates to arrive at a certain cost, an additional percentage is added for the contractor. There is little incentive in this and the Cost Plus Fixed Fee type for the contractor to minimize wastages in the use of materials, as the higher the cost the higher the fee.

Target Cost (with variable fee)

The contractor's fee or profit in this case is not fixed with a percentage or an agreed sum. It is allowed to be flexible depending on the performance of the contractor or depending on agreed varying amounts. Thus the builder may end up with a sizeable bonus if he performed efficiently or the client may obtain a discount if the contractor was evidently wasteful.

Target Estimate Contract

This is another form of contract, which specifies a penalty or reward to a contractor, depending on whether the actual cost is greater than or less than the contractors' estimate direct job cost. Usually, the percentage of savings or overrun to be shared by the owner and the contractor are predetermined and the project duration is specified in the contract. Bonuses or penalties may be stipulated for different project completion dates.

Guaranteed Maximum Cost Contract

When the project scope is well defined, an owner may choose to ask the contractor to take all the risks, both in terms of actual cost and project time. Any work change orders from the owner must be extremely minor if at all, since performance specifications are provided to the owner at the outset of construction. The owner and the contractor agree to a project cost guaranteed by the contractor as maximum. There may be or may not be additional provisions to share any savings if any in the contract. This type of contract is particularly suitable for turnkey operation

2.2. LUMP SUM CONTRACT

A lump sum contract is placed either with a bill of quantities or with drawings and specifications. The contract is let on an agreed fixed amount. Where there is no BOQ, the drawings and specifications have to be very detailed. A lump sum contract usually does not allow for fluctuation claims. For it to be successfully managed, alteration or additions must be kept at a minimum.

2.3. CONTRACT WITH PRICE VARIATION

This can also be called a fluctuation contract. This kind of contract is usually placed with BOQs, drawings, contract conditions, articles of agreement and details of sub contract works. A clause in the articles of agreement, dealing with

fluctuations allow the contract price to be varied once the price of the basic materials and rate of wages change from those listed in the "schedule of price and basic materials and labour rates" at the end of the BOQ. Depending on the particular agreement, most contracts that do not exceed 12 calendar months in duration are not usually allowed to fluctuate in stable economies.

2.4. PACKAGE DEAL

The package deal contract is also known as turnkey contract. The contracting firm's designers prepare the design and these are used in building works. The client thus pays the firm for all services. The design professional in this case works for the contractor and not the client. This system reduces the volume of communications to the minimum since most actors on the scene are under the same roof.

3.0.TYPES OF MANAGEMENT CONTRACTS

Let us at this juncture look at some Diagrams of functional relationships in the charts below: The full lines represent the contractual relationships, while the dotted lines represent the day to day interfaces for project implementation as presented by Turner, D. F.(1986)

3.1.MANAGEMENT CONTRACT (TRADITIONAL BUILDING INDUSTRY)

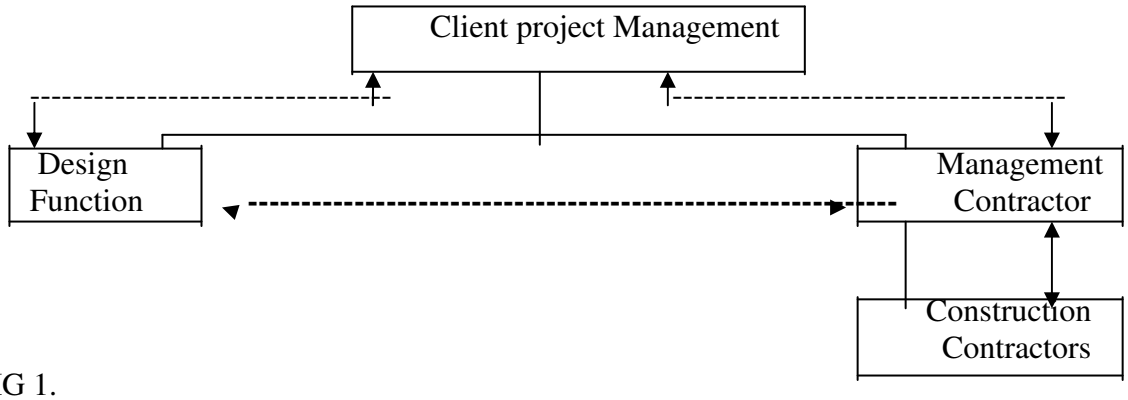

FIG 1.

Client carries out overall project management but in this case the project is constructed by using multiple construction contracts led and managed by the Management Contractor with the approval of the Client.

3.2. CONSTRUCTION MANAGEMENT CONTRACT

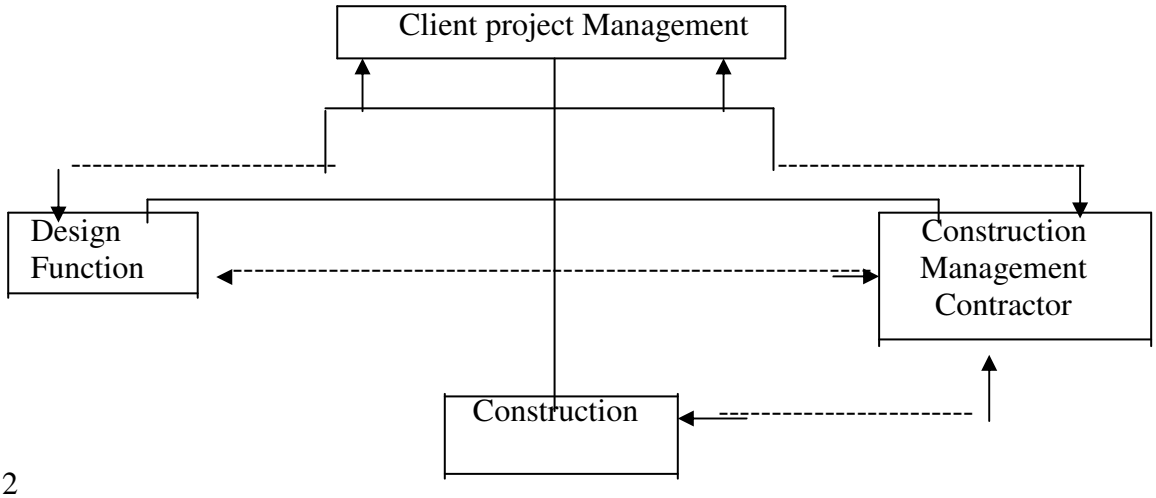

FIG. 2

Client carries out overall project management but in this case the project is constructed using construction contracts let by the client. He relates directly with the contractors. The Construction Manager carries out overall management of the construction phase only acting on a supervisory capacity.

3.3. DESIGN AND MANAGEMENT CONTRACT

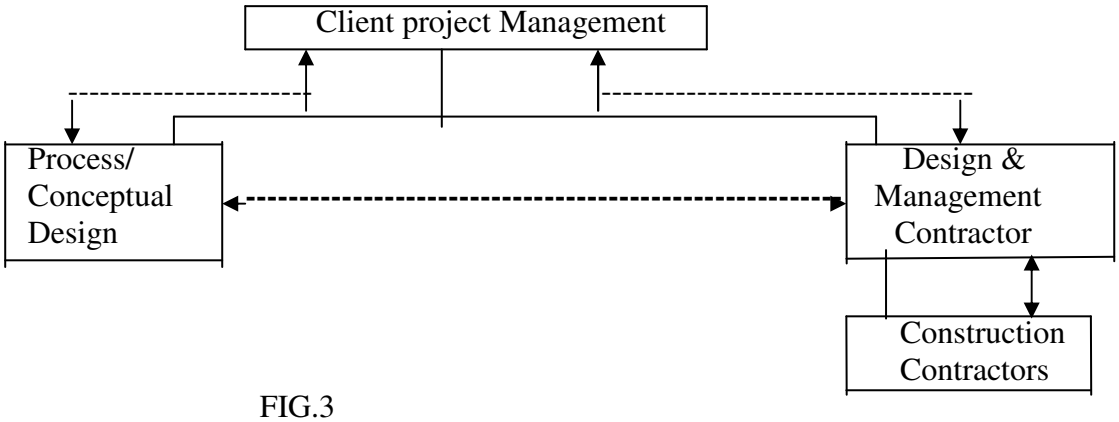

FIG.3

In this case client passes to the Design and Management not only the construction but the detailed design and engineering which has to be developed using conceptual designs which the client has established

3.4. PROCESS PLANT ENGINEERING, PROCUREMENT AND CONSTRUCTION CONTRACT (E.P.C.)

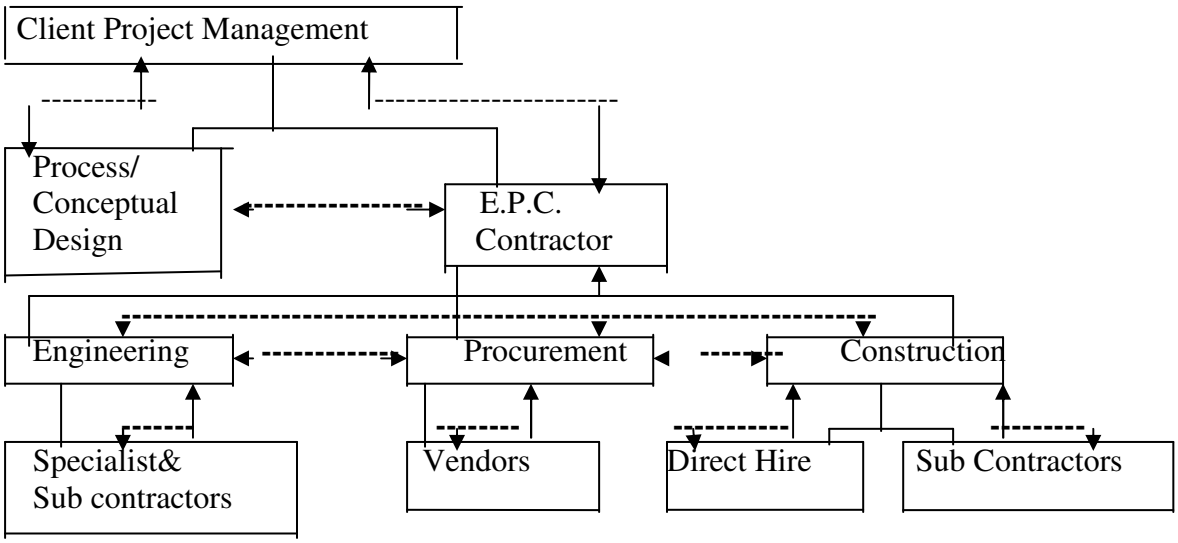

FIG.4

Clients hence mat vary the contractor element of the project depending on their own expertise and resource availability. Clients will have a group of their own project management personnel monitoring the execution of the work by the Contractor and providing the approvals, etc. required by the Contractor from time to time. The Contractor is responsible for the management and execution of the work within

3.5. PROJECT MANAGEMENT CONTRACT

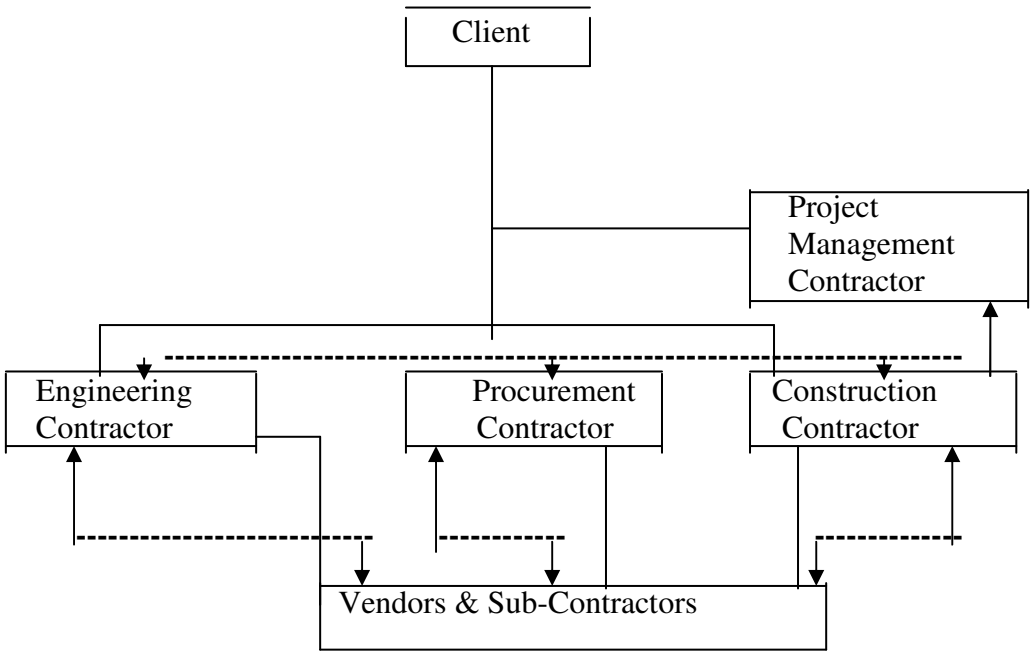

FIG.5

The project management contractor provides the overall project management organization and personnel, manages the contractors on behalf of the client, although the contracts are directly between client and the contractors and/or vendors/subcontractors.

3.6. PROJECT SERVICES CONTRACTOR

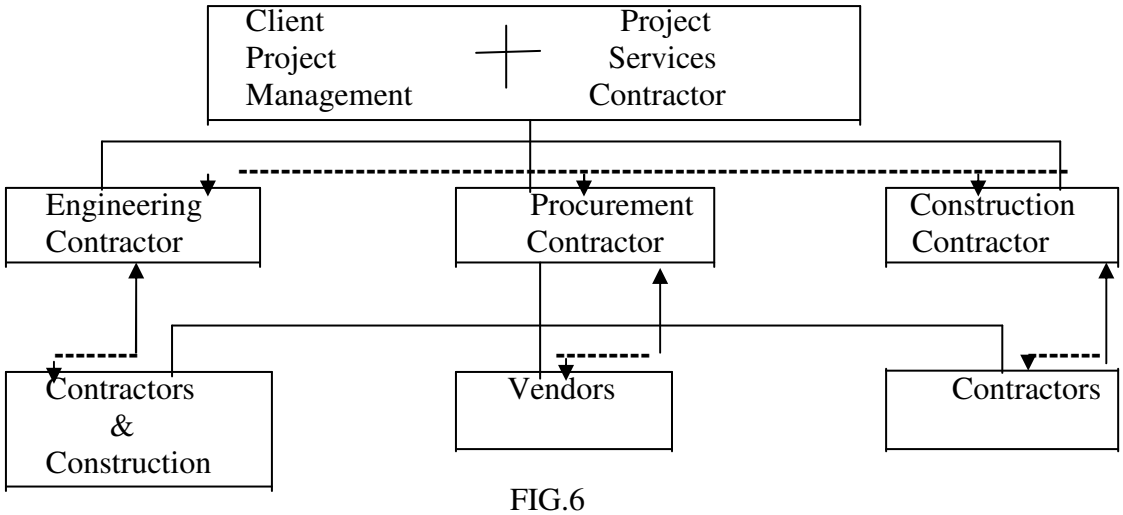

FIG.6

The above examples are typical and will be varied from project to project to meet specific needs and circumstances.

4.0 BUILDING CONTRACT RELATIONSHIPS

Below are charts showing the varieties of relationships in building contracts. The relationships are indicated as dotted lines for functional and communications whereas the full lines represent the contractual relationship. Note that persons in the upper position in each set are responsible for control functions. As presented in Turner, D. F. (1986)

(i) Traditional Method

FIG.7

(ii) Project Management Method

FIG.8

(ii) Management Contract Method

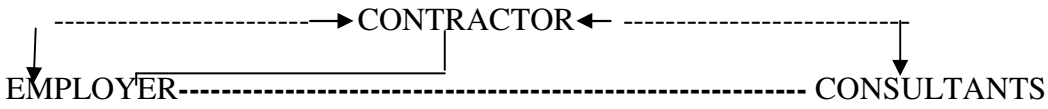

FIG.9

(iv) Design and Build Method

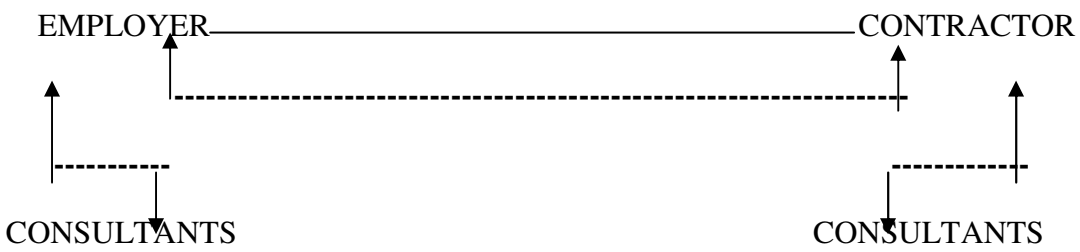

FIG.10

5.0 BREAKDOWN OF WORK PROGRAMME FOR CONSTRUCTION MANAGEMENT

The Duties of Construction Management begins at The Conception of the Project through to the realization or completion of the work in the field on to the onset of the facility management. These Duties are broken down into the following major categories;

*The Pre-Design Phase
* Onset of the Design Phase
* The Middle of the Design Task and the Inception of Procurement
* Completion of the Design, and Procurement of the Remaining Contracts
*Project Financial Control, During Construction
*Work in the Field

5.1 THE PRE-DESIGN PHASE

Construction Management at The Pre-Design Phase includes, but not limited to, Project feasibility analysis and market surveys. Site investigations and recommendations. Master scheduling. Creation of the project cost control and estimating system. Review of applicable building codes, environmental regulations, design criteria, local and federal regulations. Preparation of the environmental impact statement.

5.2 ONSET OF THE DESIGN PHASE

Construction Management at The Onset of The Design Phase includes, but not limited to, Program clarifications. Methods and materials research. Contractor and supplier lists. On board design reviews. The concept level estimate. Using CPM for the design schedule. Creating the labor relations program. Creating the safety program. Value Analysis Step 1: criteria review and choice on main building systems. Tentative separation of bid packages. Customizing the general provisions.

Identifying general conditions. Site boring and subsurface analysis.

5.3 THE MIDDLE OF THE DESIGN TASK, AND THE INCEPTION OF PROCUREMENT

Construction Management at this stage includes, but not limited to The choice of construction method, Traditional Construction Method, Phased Construction, Critical Part Method, or Project Evaluation Review Technique Method. Final establishment of bid packages. Tentative level estimates. Working Drawing estimates. Composing the project master schedule to include construction work. Preparing invitations for bids. Advertising and distributing bidding documents. Bid receipt: assisting the owner in establishing responsiveness and responsibility. Mobilizing the field operations physical requirements of the field offices. Primary general conditions: water, electricity, sanitation, access roads, heat. Establishing on site records management requirements, relocation the field staff, site surveys: establishing the footprint of the project. Setting procedures and standards of work inspection. Contractor payment: procedures and accounting controls. Detailed scheduling: incorporating contractors' CPMs and cost breakdowns into the project management plan.

5.4 COMPLETION OF THE DESIGN, AND PROCUREMENT OF REMAINING CONTRACTS

This includes, but not limited to, Final working drawing estimates. Bringing the job within the budget testing the market, comparing estimates of the remaining packages with bids already received, value analysis task team studies to eliminate useless costs, adjusting scope to remaining funds, rework on packages still to go to bid. Preparing, advertising and awarding the last packages. After the buyout-reallocation contingencies and reserves.

5.5 PROJECT FINANCIAL CONTROL DURING CONSTRUCTION

This includes development of Managerial tools for accountability and efficient supervision to establish the limits in Holdbacks for defective work. Holdbacks for poor progress. Documenting the disallowances. Payment for partially, complete work items. Coordinating the payment survey, with the schedule update. Tracking the payment process. Changes, delays, value analysis and claims. Estimating negotiating and processing change orders, encouraging and processing contractors' value analysis change proposals, keeping accurate track of the cause, duration, and effect of delays. Protecting the client against claims: records management, analyzing the claims, preparing evidence, expert witness testimony (Fenn, P. and Gameson, R. 1992).

5.6 WORK IN THE FIELD

Controlling inter-contract relationships: the special problems of separate primes-coordination meetings, general conditions, understanding the two ways to keep order: diplomacy and back

charges, making good use of insurances, convincing contractors to trade favors, quick ways to resolve tactical conflicts. Scheduling during construction. Incorporating contractors' CPMs. Showing delays and change orders in the others. Demanding and incorporating contractors' remedial plans. Day to day management of the trades. Regular routines for the field crew. Methods of inspection and testing. Diaries, punchiest memoranda and directives. The best way tom use photographs. Conversations between the construction manager's inspectors and the contractors' superintendents. Problems in pursuing the work: unexpected subsurface conditions, severe weather, ambiguous and incorrect document inexperienced contractor personnel, lack of coordination; How the construction manager can save time and money by helping to solve all of these difficulties (Sutliff, C.D. and Zack, J.G. j.r., 1987).

6.0 CONCLUSION

The ability to coordinate several major activities at once, while analyzing and resolving specific problems, is essential for Construction Management, as is an understanding of Engineering, Architectural, and other Construction Drawings. Good Oral and Written communication skills are also important, as are leadership skills. Construction Management involves the establishment of a good working relationship with many different people, the Owners, other Managers, Design Professionals, Supervisors and Crafts Men. The building industry could be seen as a disorganized conglomerate, employing the services of all manners of people and various professionals, to carry out one interest and one interest alone, the realization of building project. It therefore becomes imperative that these diverse disciplines and multitude of people must be managed and harmonized in order to optimize the resources available for the benefit of society in realizing the building project, within the constraints of function, time and cost (William, R. 1986). That is the basic premise of Construction Economics, Management of Man, Materials and Money for the benefit of society.

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