

Methods of minimizing delays construction essay



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A successful construction project is accomplished when the project is completed and hand over to the owner within time, costs, specifications and quality required and to the satisfaction of stakeholders. Thus, completing a construction project on time is vital as it secure the rights of the participating parties on the project. When a project is delayed, it will cause the resources employed to be exceeded as what has been planned. This extra use of resources will lead to disputes and claims arise as extra costs will be incurred to complete the project by the participating parties. Abd El-Razek et al. (2008) identified that delay in construction project is considered one of the most common problems causing a multitude negative effect on the project and its participating parties. Delays are insidious often resulting in time overrun, cost overrun, disputes, litigation, and complete abandonment of projects (Sambasivan and Yau, 2007).

Many projects are of such a nature that the client will suffer hardship, expense, or loss of revenue if the work is delayed beyond the time specified in the contract. Then, again, delay has cost consequences for the contractor: standby costs of non-productive workers, supervisors, and equipment, expenses caused by disrupted construction and material delivery schedules and additional overhead costs (Clough, 1986).

Delay on project will affect the parties to the contract involved. Issues regarding entitlement to extra costs or prolongation of time for the project may arise as consequences to the project delay. Questions arise as to the causes of delay and the assigning of fault often evolves into disputes and litigation (Bolton, 1990). Thus, it is very important to find out the methods with relevant to its causal factors of delay so that the effects of the delay on

the project can be reduced. This is because the project delay itself and also the resolution of disputes are both a waste of resources. It is important to predict and identify problems in the early stages of construction and diagnose the cause to find and implement the most appropriate and economical solutions (Abdul-Rahman and Berawi, 2002).

Several researches had been carried out to studied and recommended on methods to minimize delay in construction industry in their studies of investigating causes or causes and effects of delays in either specific types of construction projects or in general, representing the overall construction industry.

3. 2 Methods of Minimizing Construction Delays

Assaf et al. (1995) in the literature review of his study of investigating the causes of delay in large building projects in Saudi Arabia, noted that studied by Chalabi and Camp (1984) suggested that in developing countries, where workers are relatively unskilled, adequate planning at the very early stages of the project was important for minimizing delay and cost overruns in most projects.

Chan and Kumaraswamy (1997) conducted a study to survey the causes of construction delays in Hong Kong as seen by clients, contractor and consultants, and examined the factors affecting productivity. This study also suggests some useful pointers towards minimizing the problems causing delays on construction site. Following are the recommendations:

The relationship between success on site and strong management teams underlines the need for effective site management and supervision by

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contractors and consultants. Manpower, at both the technical and the managerial levels, should have their own knowledge updated by continuous professional development schemes. This may be in the form of short training programmes or day release courses in educational establishments.

Insufficient knowledge of the sites causes many delays in projects. The investigation of site conditions, together with the design of groundworks and foundations, should be thorough, complete and clearly presented before commencement of construction so as to reduce the impact of any unforeseen ground conditions.

Effective data communication between various groups and levels involved in a project, emphasizes the need for efficient methods of information processing in the construction industry. To accelerate the communications and decision making among all parties, appropriate overall organizational structures and communication systems linking all project teams should be developed throughout the whole life of the project. The roles and responsibilities of those involved in the project team should be clearly defined, and the designated decision-makers should also be clearly identified.

Comprehensive strategies need to be formulated to minimize variations, whether client-initiated or consultant-initiated, wherever possible. A clear and thorough client brief is considered the most useful strategy for reducing variations. Contingency allowances may be incorporated for inevitable variations. These allowances may be better quantified by using risk analysis techniques. Strategies should also be formulated to mitigate the impact of

such inevitable variations after obtaining the consultants' advice, together with the contractors' inputs, on their cost and time implications. Value management techniques may be useful both when developing the design from the brief at the conceptual design stage, as well as in limiting any variations to those that are absolutely essential.

The differentials in perception between the different groups of participants in the industry should be noted and discussed in suitable fora, with a view to bridging the gaps and avoiding or resolving some of the avoidable problems that have been highlighted herein.

The results of the foregoing survey should be taken into consideration in developing a 'construction time' prediction model for local building and civil engineering construction industries, as has been planned in the next phase of this research programme in Hong Kong.

Noulmanee et al. (1999) investigated causes of delays in highway construction in Thailand. They suggested that delay can be minimized by discussions that lead to understanding

Aibinu and Jagboro (2002) conducted a study to survey the problem of construction delays in Nigeria. The study was carried out to examine the effects of delays on the delivery of the projects in Nigeria and some recommendations were made to minimize the effects of the projects delays. A questionnaire survey was done over 61 construction projects to determine and assessed the impact of the delay projects on its delivery. Time and cost overruns were found to be the common effects of construction delays. The

recommendations made to reduce the impact of the construction delays were:

Acceleration of site activities coupled with improved client's project management procedures; and

Inclusion of the contingency allowance in the pre-contract estimate.

Chan and Kumaraswamy (2002), in their study of compressing construction duration in Hong Kong explored strategies used to compress construction durations for various types of building projects. The paper sought out the critical factors that contribute to the faster construction procedures in Hong Kong. The authors recommended specific technological and managerial strategies to be used to reduce the construction durations.

Odeh and Battaineh (2002) in the study of causes of construction delay in traditional contracts suggested that to improve the situation of delays, a joint effort by all participants in the construction industry is needed by:

Enforcing liquidated damage clauses and offering incentives for early completion.

Developing human resources in the construction industry through proper training and classifying of craftsmen. This calls for providing incentives such as offering a tax deduction on money spent on training, and for authorizing trade unions or other agencies to regulate, follow-up on training, and classify trades. Developing human resources also applies to construction engineers who usually lack adequate managerial skills. There is an urgent need for

offering training courses in scheduling, time and cost control, information systems, and management of human resources.

Adopting a new approach to contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors.

Adopting new approaches to contracting, such as design-build and construction management (CM) types of contracts. Such contracts reduce delays by limiting owner interference, improving the design, and improving the contractual relationships among all parties to the project.

Frimpong et al. (2003) give some recommendations minimize delays in the study of causes of delay and cost overruns in the construction of groundwater construction projects in Ghana. Their recommendations are as follows:

Appropriate funding levels should always be determined at the planning stage of the project so that regular payment should be paid to contractors for work done.

In order to improve contractors' managerial skills there is need for continuous work-training programs for personnel in the industry to update their knowledge and be familiar with project management techniques and process.

Effective and efficient material procurement systems should be established within projects. Material procurement has the potential to cause major delays to construction projects. Therefore, material procurement process

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should be executed properly by improving procurement process in order to avoid supply delays.

Developing effective and efficient technical performances in the groundwater industry through different types of training programs. The training should cover project planning, scheduling, time and cost control, and the information systems.

There should be adequate contingency allowance in order to cover increase in material cost due to inflation.

Nguyen et al. (2004) studied the project success factors in large construction projects in Vietnam. Factor analysis was employed to categorize these success factors perceived by 109 respondents from 42 construction-related organizations. The success factors identified in this study were:

Clear objectives and scope;

Commitment to project;

Top management support;

Timely, valuable information from different parties;

Effective strategic planning;

Awarding bids to the right designer/contractor;

Continuing involvement of stakeholders in the project;

Frequent progress meeting;

Adequate funding throughout the project;

Availability of resources;

Absence of bureaucracy;

Community involvement;

Clear information and communications channels;

Accurate initial cost estimates;

Systematic control mechanisms;

Competent project manager;

Multidisciplinary/competent project team;

Comprehensive contract documentation;

Up to date technology utilization; and

proper emphasis on past experience.

Five critical success factors were identified:

Competent project manager;

Adequate funding until project completion;

Multidisciplinary/competent project team;

Commitment to project; and

Availability of resources.

Obviously, the factors shown are mostly human-related factors. This implies that people play a decisive role regarding the success or failure of a project.

Further, factor analysis uncovered that most of the success factors can be grouped under four categories, here titled the four COMs:

Comfort concerns ensuring that resources, efforts and leadership are well aligned for the implementation of the project. It includes adequate funding throughout the project, comprehensive contract document, availability of resources, continuing involvement of stakeholders, and competent project managers.

Competence requires having appropriate technology, experience, and specialties available for the project. It includes up to date technology utilization, proper emphasis on past experience, multidisciplinary/competent project team, and awarding bids to the right designer/contractor.

Commitment ensures that all parties concerned with the project and all levels in the management hierarchy of each participating organization are willing to manage, plan, design, construct and operate the facility harmoniously. It includes commitment to project, clear objectives and scope, and top management support.

Communication helps clarify and disseminate all necessary project information and status to all internal and external project stakeholders. The project will then have the opportunity to avoid failure and reach for success through the achievement of team-spirit and a sense of ownership. It includes

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community involvement, clear information/communications channels, and frequent progress meeting.

Koushki et al. (2005) recommended some suggestions which could be used to minimize time delays and cost overruns in the study of investigating the delays and cost increases in the construction of private residential projects in Kuwait. They suggested that the owner of a new residential project in Kuwait to:

Ensure adequate and available source of finance;

Perform a preconstruction planning of project tasks and resource needs;

Allocate sufficient time and money on the design phase;

If cost-effective (depending on the size of the residential project), hire an independent supervising engineer to monitor the progress of the work and ensure timely delivery of materials; and finally, the most important factor of all,

Select a competent consultant and a reliable contractor to carry out the work.

Assaf and Al-Hejji (2006) suggested some recommendations that pointed out by all parties which are the contractors, consultants and owner to minimize and control delays in construction projects.

Owners should give special attention to the following factors:

Pay progress payment to the contractor on time because it impairs the contractors ability to finance the work.

Minimize change orders during construction to avoid delays.

Avoid delay in reviewing and approving of design documents than the anticipated.

Check for resources and capabilities before awarding the contract to the lowest bidder.

Contractors should consider the following factors:

Shortage and low productivity of labour: enough number of labours should be assigned and be motivated to improve productivity.

Financial and cash flow problems: contractor should manage his financial resources and plan cash flow by utilizing progress payment.

Planning and scheduling: they are continuing processes during construction and match with the resources and time to develop the work to avoid cost overrun and disputes.

Site management and supervision: administrative and technical staff should be assigned as soon as project is awarded to make arrangements to achieve completion within specified time with the required quality, and estimated cost.

Consultants should look to the following points:

Reviewing and approving design documents: any delay caused by the consultant engineer in checking, reviewing and approving the design submittals prior to construction phase, could delay the progress of the work;

Inflexibility: consultants should be flexible in evaluating contractor works. Compromising between the cost and high quality should be considered.

Finally; Architect/design engineer should focus on the following issues:

Producing design documents on time: Architect/engineer should set a schedule to complete design documents on time, otherwise result in a delay of work completion.

Mistakes and discrepancies in design documents: they are common reasons for redoing designs and drawings and may take a long time to make necessary corrections.

Ibnu Abbas Majib (2006) in his study of causes and effects of delay in Aceh construction industry, Indonesia suggest some methods which can be employed to minimize construction delays. A total of thirty five methods of minimizing delays were identified in his study. The most effective methods of minimizing delays identified are to:

Ensure adequate and available source of finance until project completion;

Competent project manager;

Availability of resources;

Frequent progress meeting;

Awarding bids to the right/experience consultant and contractor;

Use of experienced subcontractors and suppliers;

Multidisciplinary/competent project team;

Accurate initial cost estimates;

Competent and capable of clients representative;

Use of appropriate construction methods;

Perform a preconstruction planning of project task and resources needs; and

Project management assistance.

Abd El-Razek et al. (2008) conducted a similar study of causes of delay in building construction projects in Egypt from the point of view of contractors, consultants, and owners suggested that in order to significantly reduce delay a joint effort based on teamwork is required.

Fugar and Agyakwah-Baah (2010) emphasized in their study of delays in building construction projects in Ghana from the perspective of clients, consultants and contractors that the adequate and timely provision of financial resources in building construction project management cannot be over emphasized. This is because the finance is the hub around which everything else revolves. Everybody and everything connected with construction is adversely affected by lack of sufficient cash flow. They made the some recommendations as follows:

Construction clients must ensure that funds are available or adequate arrangements for funds are made before projects are started.

The long and bureaucratic processes involved in honouring payments to contractors in Ghana must be shortened for efficiency and contractors' payments must be honoured as and when they due in strict compliance with the provisions of the contract.

Contract provisions which allow contractors to claim interest on delayed payments must be strictly enforced to serve as deterrent to clients.

The idea of establishing a commercial bank for building and construction is worth revisiting so that contractors can have access to credit in times of liquidity difficulties.

On the other hand, to overcome some contractors' ineptitude which correlates directly with delay factors such as underestimation of cost, time of completion and complexity of projects, poor scheduling and control and poor site management, the researchers recommend the following actions.

The Civil Engineering and Building Contractors Association of Ghana must institute measures to ensure that its members go through continual education so that the technical and managerial competences of contractors who belong to it can be improved. The acquisition of a certain number of credit hours in continual education should be a criterion for membership renewal.

The Ministry of Works and Water Resources, the body responsible for the registration and classification of contractors wishing to execute public

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projects, must insist on its requirement that contractors must have in their employment certain key technical staff as a condition for registration. Above all, effective ways must be designed to verify the list of staff produced by contractors in support of their application and to ensure also that these key staff positions are continually filled by technically competent individuals.

Summary

53 methods of minimizing delays were identified from the review of literature above. These methods will be used to develop questionnaire for surveying purposes. Followings were the methods identified:

Perform a preconstruction planning of project tasks and resources.

Continuous update manpower, both technical and managerial.

Thorough and complete investigation of site conditions.

Clear information and communications channels.

Clear and thorough client brief.

Include of the contingency allowance in the pre-contract estimate.

Use value management techniques when developing the design from the brief at the conceptual design stage, as well as in limiting any variations to those that are absolutely essential.

Accelerate site activities.

Improve client's project management procedures.

Enforce liquidated damage clauses.

Offer incentives for early completion.

Adopt a new approach to contract award procedure by giving less weight to prices and more weight to the capabilities and past performance of contractors.

Adopt new approaches to contracting, such as design-build and construction management (CM) types of contracts.

Determine appropriate funding levels at the planning stage of the project.

Effective and efficient material procurement systems.

Competent project manager.

Multidisciplinary/competent project team.

Commitment to project.

Allocate sufficient time and money on the design phase.

Hire an independent supervising engineer to monitor the progress of the work.

Pay progress payment to the contractor on time.

Minimize change orders.

Avoid delay in reviewing and approving of design documents.

Check for resources and capabilities before awarding the contract to the lowest bidder.

Number of labours assigned should be enough and be motivated to improve productivity.

Contractor should manage his financial resources and plan cash flow by utilizing progress payment.

Continuous planning and scheduling during construction.

Site management and supervision: administrative and technical staff should be assigned as soon as project is awarded to make arrangements.

Produce design documents on time.

Avoid making mistakes and discrepancies in design documents.

Consultants should be flexible in evaluating contractor works. Compromising between the cost and high quality should be considered.

Clear objectives and scope.

Frequent progress meeting.

Top management support.

Timely, valuable information from different parties.

Effective strategic planning.

Award bids to the right/experience consultant and contractor.

Continuous involvement of stakeholders in the project.

Availability of resources.

Absence of bureaucracy.

Community involvement.

Systematic control mechanisms.

Comprehensive contract documentation.

Up to date technology utilization.

Proper emphasis on past experience.

Use of experienced subcontractors and suppliers.

Accurate initial cost estimates.

Competent and capable client's representative.

Use of appropriate construction methods.

Project management assistance.

Idea of enforce contract provisions which allow contractors to claim interest on delayed payments must be strictly to serve as deterrent to clients.

Establishing a commercial bank for building and construction so that contractors can have access to credit in times of liquidity difficulties.

Design effective ways to verify the list of staff produced by contractors in support of their application and to ensure also that these key staff positions are continually filled by technically competent individuals.