

Construction Delay Risk and its Prevention Measures

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Abstract

The purpose of this paper was to explore delay avoiding measures and strategies. The paper was based on previous work of authors on finding delay causes. Firstly, the paper has discussed about delay avoidance measures prescribed by the previous work. As the previous study identified five main causes of construction delays, various measures and strategies to overcome those delay problems have been discussed in sequence in the last sections. Major delay prevention strategies are: involving stakeholders in the project decisions, outreach program, realistic time and resource estimation, try to adjust the triple constraints of time, cost and scope, ensure fair and complete disclosure of information at an early stage of the construction project, contractor, itself should inquire about patent design errors prior to submitting its bid, owner should include in its contract with the consultant an indemnity (protection) clause etc.

Keywords: Construction Project, Delay Causes, Project Participants, Delay Avoidance Strategies

1. Introduction

Construction projects rarely are completed without encountering some problem not anticipated by the owner or the contractor, such as errors in the construction plans, site conditions differing from what was expected, new or improved construction methods becoming available, or changing owner requirements. Delay risk is defined as the exposure to possible economic loss or gain arising due to delay in construction process. Risk management is a very important aspect of working our project schedule. Identifying risks with mitigation strategies upfront and updating them through out the project will guide towards achieving the project objectives. Risk mitigation strategy includes estimating the level-of-effort to recover, eliminate, or reduce the risk. When a risk materializes it does impact schedule, cost, or resources; however, recognizing the risk early allows time to adjust the time, resources, and scope accordingly.

2. Purpose and Scope

The purpose of this paper was to explore the some

of delay prevention measures and avoidance strategies. This paper is an extension of previous work regarding identification of causes of delays and focused on dealing with the delay preventive strategies of those findings.

3. Delay Prevention Measures

Delays cause various undesirable effects in projects, therefore these must be stopped occurring in the construction projects. It is well understood that the construction project is dynamic which involves various internal and external activities (Williams et al. 1995) so, the consequences could not be predicted in the beginning however, proactive approaches or management principle could be initiated to minimize the delays. Following are some of the fundamental management principles, contractual provision and other immediate measures, which might help to improve the unnecessary delays.

3.1 Application of Fundamental Principles

According to Ellis and Thomas (2002), following principles are relevant to timely completion. They are: cost-time relationship, time priority, team and personal

accountability, rewards for superior work, employing best knowledge, efficiency in decision making, using innovative thinking.

3.2 Contract Provisions

Use of a liquidated damages provision based upon a reasonable completion schedule and realistic money figure benefit the contractor in some ways. With a liquidated damage clause, the contractor will know precisely what its risk might be if its work is delayed. Therefore, the contractor is made bound to finish the work in time.

According to Samantha (2002), to avoid delay risks and claims, following facts shall be studied thoroughly before submitting bids in a project: (1) adequate provisions for an extension of time (2) specific provisions allowing for the resolution of delay related issues within the scope of the contract; (3) adequate construction time for the special circumstances; (4) clauses in the contract allowing for proprietary rights over the float (5) contract providing for both an extension of time plus compensation for costs in the event of excusable and compensable delay; (6) a contractor should include contract terms which specify the exact heads of damages to which it is entitled for compensation in the event of compensable delay; and (7) an owner should consider obtaining a genuine pre-estimate of the owner's damages in the event of delay in the completion of the work.

3.3 Immediate Measures

Even the project management has applied fundamental principles and other contract provisions to prevent the delays, the project might experience some delays extending minor in nature to the major one. As delays are usually attributed to construction disputes, therefore these should be managed early in project proceedings. Following measures can be taken to immediate solving of construction delays (Abdul-Rahman et al., 2006): i) reasonable extension of time, ii) review buildability iii) increase the productivity iv) change the delaying parties, v) showing flexibility vi) frequent site meetings viii) delegating more executive authorities to project manager and, ix) change construction methods/use different techniques.

3.4 Recommendations Based on Field Study

Previous field study involving two authors of this paper (Acharya, Lee and Im, no year) have identified five construction delay risk factors as follows: i. public interruptions ii. tight project duration iii. lack of site access iv. Differing site conditions and v. design errors. Various avoidance measures for above delay risk will be discussed briefly in next sub sections.

3.4.1 Public Interruptions

- By involving stakeholders in the decision making process.
- Exploring various alternate solutions from people, NGOs etc.
- Implementing outreach program: Outreach program was successfully implemented in road and bridge maintenance projects (Zetlin and Ojar, 2003). The outreach plan involves following process: i. identifying the target audiences (people) ii. determining what information is needed and when, iii. deciding on the communications methods (Radio/TV broadcast, pamphlets, Newspaper, public presentations, letters etc.) that will be used to deliver the information (message) iv. teaming up of engineering, communication as well as public relation development consultant, v. the team would educate the public about how the project would affect them, and also address stakeholders' concern.
- Project impact assessment and justifiable compensation of expropriated property

3.4.2 Unrealistic (tight) Project Duration

- Realistic time and resource estimation
 - i) comparing a similar area of work and evaluating its durations, ii) apply (ought to be) past experience as well as future planning, ii) adjusting the durations according to the historical as-built information, iii) use of CPM schedule iv) regular monitoring of two key elements of schedule: work force and money.
- Try to adjust the triple constraints of time, cost and scope
 - i) if budget is not enough, reduce scope ii) if time constraint is not alignment with the cost and scope, increase the resources that are available for the project iii) adding resources to the project makes the cost go up but may allow achieving the deadline.
- In case of strict deadline
 - i) early involvement of a design team and consultant ii) provision of double shift and work acceleration iii) fast track construction method iv) close supervision and monitoring of work v) use of modern high productivity tools and equipment vi) charging (penalizing) the

contractor for overrunning the established date viii) rewarding substantially for early completion

- Utilize risk management policy

3.4.3 Lack of Site Access

- In general, contractor has the obligation to complete the work, hence must coordinate all aspects of the construction work.
- All parties should ensure that they have the ability to cooperate and carry out their duties.
- If any party has the suspicion, then it is better not to enter in the contract with other party.
- The owner shall not make contract if the site is not 100 percent under its titleship.
- If the site cannot be acquired 100%, revise the project schedule and then proceed for contract.

3.4.4 Differing Site Conditions

- The owner should inquire and assess the contractor's knowledge about the geographical area of the proposed construction site.
- The owner should know as much about the site conditions as possible before entering into the contract by conducting adequate site or subsurface investigations through its geotechnical consultant.
- Separate the case from main contract by change order as soon as possible and include it in another contract with the contractor to be completed later (Samantha, 2002).
- The owner should avoid "disclaimer clauses" or "limiting clauses" in the contract which contain exculpatory (barring) language and require that the contractor assume most, if not all, of the risk of differing site condition.
- Ensure fair and complete disclosure of information at an early stage of the construction project.

3.4.5 Design Errors

- The contractor, itself should inquire about patent design errors prior to submitting its bid and should ensure that they adequately review plans and specifications for obvious deficiencies.
- An owner should hire a reputable and competent design consultant to reduce likelihood of insufficient plans and specifications.
- The owner should include in its contract with the consultant an indemnity (protection) clause.
- To avoid design-caused delays in a design-build arrangement, a detailed binding schedule such as the critical path method (CPM) schedule for both design

and construction will alert all parties to their responsibilities and to the potential adverse consequences of the failure to perform in a timely manner.

4. Conclusions

Delays cause various undesirable effects in projects, therefore these must be stopped occurring in the construction projects. The purpose of this paper was to explore delay avoiding measures and strategies. This paper has discussed about delay avoidance measures of delay causes identified by the previous work. Delay avoidance strategies discussed for the delay causes are: i) public interruptions, ii) tight project schedule, iii) lack of site access, iv) differing site conditions and v) design error. It is hoped that the delay avoidance strategies recommended in this paper would be conducive in some extent to construction managers.

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