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A Study on the Existing Networking Systems Followed in Construction Project and Evaluating a Module for Implementing Fast Track System for Adoption

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ABSTRACT: One of the most challenging jobs that any managers can take on is the management of large-scale projects that requires coordinating numerous activities throughout the organization. A myriad of details must be considered in planning how to coordinate all these activities, in developing a realistic schedule, and then in monitoring the progress of the project. The project delivery system is a key factor in enabling successful implementation of a building project. The right method may help to avoid problems and be the key to the attainment of project-specific special goals. The purpose of Fast track project management technique is to reduce the project time by overlapping the project design and construction phases and thereby by making maximum possible activities run parallel to each other so as to reduce the time. The main aim is to study the fast tracking process of a real estate project. And to evolve fast tracking model based on dependency structure matrix. As engineering activities are interdependent and sequenced based on information flows, modeling information exchange for these activities is impossible with CPM or PERT. Researcher have investigated the dependency structure matrix as a tool to identify and manage information exchange between activities. In the Chennai city, most of the mega infrastructure projects are delayed due to some technical or financial reason. So, fast tracking is one of the appropriate options to take project on its proper track.

KEYWORDS: Activities, schedule, fast track, CPM, PERT

I. INTRODUCTION

A Project consists of interrelated activities which are to be executed in certain order before the entire task is completed. The activities are interrelated in logical sequence which is known as precedence relationship. A particular activity of a project cannot be started until all its immediate preceding activities are completed. Schedule controlling is a critical task in managing construction projects. However, in practice most contractors do not control and update schedule frequently due to the lack of proper controlling method. In the real construction world, most decision-making rules are not based on the mathematical method, but on the contractor's assumptions, limitations and management style. Thus, expert's experience somehow is a significant factor for performing a well scheduling. This paper will propose a construction scheduling system using traditional project scheduling Your goal is to simulate the usual appearance of papers in an *IEEE conference proceedings*. For items not addressed in these instructions, please contact your Publications chair.

The objectives of this study are manifold and they are as follows:

- To study the existing network systems of different construction projects
- To evaluate the integration of construction of design phases
- To analysis the effect of overlapping of work in terms of quality
- To estimate the time reduction of fast tracking projects



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• To propose the module for implementing a fast track system

The implementation of a building project involves the cooperation of many parties: the owner, various designers, contractors, and suppliers. Consequently, there are numerous project delivery systems for establishing the division of labour between these parties, their contractual and operational relations, and the rules of the game in general.

According to the roughest division, there are three primary methods:

- Design-bid-build (DBB), where the client assumes responsibility for design and the contractor is involved only in construction, i.e. the "traditional method".
- Construction management (CM), where a separate management organization is involved in the supervision of design and carrying out of the construction activities.
- Design-build (DB), where a contractor under contract to the clients is responsible for the projects design and implementation as an entity.

The project delivery system is a key factor in enabling successful implementation of a building project. The right method may help avoid problems and be the key to the attainment of project-specific special goals. These goals may include, for instance, quick project completion, low acquisition price, practical assignment of risk between the parties, and providing the owner the possibility to affect the details of the design solution and the amount of selfperformed work, etc. Certain procurement methods are typically used for certain projects but there are also variations. A method of project delivery in which the sequencing of construction activities enables some portions of the project to begin before the design is completed on other portions of the project.

The purpose of Fast track project management technique is done to reduce the project time by overlapping the project design and construction phases and thereby by making maximum possible activities run parallel to each other so as to reduce the time. The main aim is to study of fast tracking process of a real estate project. And to evolve fast tracking model based on dependency structure matrix. As engineering activities are interdependent and sequenced based on information flows, modeling information exchange for these activities is impossible with CPM or PERT. Researcher have investigated the dependency structure matrix as a tool to identify and manage information exchange between activities. In the Ahmedabad city, most of the mega infrastructure project are delay due to some technical or financial reason. So that, there are major losses in time and project cannot complete within its time period. For these project, time is real money. So, fast tracking is one of the appropriate options to take project on its proper track.

Fast tracking means that we look at activities that are normally done in sequence and assign them instead partially in parallel. For instance normally we would not start constructing a building until the design was complete. However, if we were fast tracking, you would start constructing the building in areas where we felt the design was pretty solid without waiting for the entire design to be completed. A good rule of thumb is that sequential activities can sometimes be fast tracked by up to 33%. In other words, if we are fast-tracking, we can start the second of two sequential activities when the first activity is 66% complete. A fast-track project delivery strategy is designed to leverage the ability to execute multiple phases like the design, procurement and construction phases simultaneously in order to substantially reduce the overall project duration. The ability to fast track implies that the finish-to-start relationship between the activities was discretionary whereas crashing a project means to throw additional resources at the critical path.

II. METHODOLOGY

A detailed study was made to determine the factors that influence project scheduling in existing network systems. Literature was collected from various sources and proper study and analysis of the literature was done for identifying the issues of project scheduling in existing network systems. Survey is to be done in the industry using the questionnaire. Then the survey results are analysed using study of various types of networking systems.

The resulting importance and effectiveness of the methodology is shown. After obtaining the results, conclusion is stated along with the need and the scope of the project. study on various project delivery system is made in order to check the project time duration in construction projects. The concept of design build is compared with normal traditional delivery system. Analysis is made on fast tracking concept for time optimization in construction



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projects. Evaluating the effectiveness of fast tracking networking system with the construction projects. On the basis of evaluation a module for fast track implementation is adopted.

In this project, both qualitative and quantitative approaches are used. The questionnaire of this study is designed to get the factual information about local factors of networking systems in building projects as well as the opinions of Project managers about these practices.

Various construction projects are surveyed by their complexity, uniqueness, and the fact that there are various types of constraints imposed by stakeholders. It is observed that the construction projects are subjected to numerous constraints of various types, including contractual due dates, resource limitations, and safety, financial, and managerial constraints. A better methodology of optimization of schedule planning is applied and analysis of the factors which affect the project negatively and there by applying efficient project delivery techniques based on proper scheduling. Better conclusions and outcomes are shown and suggested.

III. QUESTIONNAIRE SURVEY

The purpose of this questionnaire is to obtain professional opinion of clients, consultants and contractors on networking system in existing construction. This is to identify the major causes of project scheduling and analysis them on the basis of data collected.

3.1 ANALYSIS OF NETWORKING SYSTEMS IN CONSTRUCTION PROJECTS

Types of construction involved in cpm:

From the survey construction involved in critical path method are building construction 40%, residential construction 30%, industrial construction 20%, heavy construction 10%. **Other scheduling techniques :**

Various types of scheduling techniques used in construction are PERT (program evaluation and review techniques), 4D planning, line of balance (LOB), linear balance charts, bar chart. In other schedule methods. 35% uses pert, 30% line of balance, 25% uses bar charts, 10% uses others

Company using CPM:

There are various advantages using cpm are valid management tools 17%, dispute resolution 50%, contract requirement 33%, improves communication among parties 50%.

Degree of success in achieving the advantages of cpm:

Very successful construction 30%, moderate successful 40%, unsuccessful 10%, undecided 20%.

Levels of management of CPM:

CPM used at various levels of management in construction very important 41% used by top management, 31% used by project management, 19% superintendents, 9% used by foremen Software using cpm:

Various software using cpm are primavera, Microsoft projects, suretrak Scheduler. Primavera 53%, Microsoft project 42%, suretrak 33%, scheduler 11% **CPM for present success of the company:**

CPM for present success of the company:

Cpm present successs of the company which involved very important 33 %, moderate important 56%, unimportant 6%, uncertain 17%



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3 LIMITATIONS OF NETWORKING SYSTEMS

- Types of logic network used are arrow, precedence.
- Detailed planning of work prior to start of construction
- Operation and maintenance of project
- Coordination of own trades
- Tracking shop drawings and submittals
- Improved scheduling
- Time saving
- Help to train future project managers
- Reduces delays
- Resource controlling scheduling
- Cost control

IV. FASTTRACKING IN CONSTRUCTION

A method of project delivery in which the sequencing of construction activities enables some portions of the project to begin before the design is completed on other portions of the project.

Fast tracking means that you look at activities that are normally done in sequence and assign them instead partially in parallel. For instance, normally you would not start constructing a solution until the design was completed. However, if you were fast-tracking, you would start constructing the solution in areas where you felt the design was pretty solid without waiting for the entire design to be completed. Fast-tracking always involves risk that could lead to increased cost and some rework later. For instance, in the example of designing and constructing an application, it's possible that the design might change before it is finalized, and those final changes may result in having to redo some of the construct work already underway.

- A good rule of thumb is that sequential activities can sometimes be fast-tracked by up to 33%. In other words, if you're fast-tracking, you can start the second of two sequential activities when the first activity is 66% complete. There is risk involved. However, this seems to be a level of fast-tracking risk that is normally acceptable.
- Fast-track construction projects have become more popular in recent years in response to growing industry demand. By allowing downstream construction activities to start with incomplete information from upstream design activities, fast-tracking (through overlapping) allows for shorter project duration at the expense of potential rework. This leaves practitioners with the challenge of determining the optimal fast-tracking strategy to meet project schedule requirements while avoiding excessive amounts of rework. This paper presents an optimization-based model that serves as a decision support tool in scheduling fast-track construction activities. The model takes into consideration information exchange between upstream and downstream activities and uses the concepts of sensitivity and evolution to maximize the net benefits of fast-tracking. The model is illustrated on an ongoing construction project, which was analysed under various overlapping scenarios. The results indicate substantial time savings depending on the speed of evolution and sensitivity. The project schedule can be shortened by up to 50 days without causing excessive amounts of rework



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V. SCHEDULE COMPRESSION TECHNIQUES

Schedule compression can be defined as "the shortening of the required time for accomplishing one or more engineering, procurement, construction, or startup tasks (or a total project), to serve one of three purposes: reducing total design-construct time from that considered normal; accelerating a schedule for owner convenience; and recovering lost time after falling behind schedule" Compression techniques are easiest to apply in the project planning phase, such as when the construction schedule-- as initially planned--is longer than the proscribed contract duration. The project manager can compress the schedule before construction is started. Compression becomes more difficult if necessary to get a project back on schedule after it has fallen behind. The project manager isunder a great deal of pressure and often does not have the time to apply the most cost effective techniques for compression.

The Construction Industry Institute has cataloged more than 90 compression techniques, grouped into eight different categories: Ideas Applicable to All Phases of a Project, Engineering Phase, Contractual Approach, Scheduling, Materials Management, Construction Work Management, Field Labor Management, and Startup Phase. Some techniques shorten an activity's schedule time while others prevent needless time losses associated with project activities or management actions.

VI. CONCLUSION

The importance of time in the construction project can not be overstated. To the owner, the sooner the project is complete, the sooner operation and use of the finished project can commence. Economically, time equates to thousands of dollars per day, depending on the project's ultimate use. Considering these stakes, it is of vital interest to the owner to shorten the entire project delivery time, from the determination of the need for the new facility to the turnover of the completed project. Each day of delay can result in unacceptable losses in revenue or additional expenses.

Time is also of great importance to the contractor during the construction of the project. Indirect and overhead costs continue to add up while construction is underway.

Delays in final completion can result in an erosion of profits, or even losses. As discussed previously, there are numerous ways to compress the time needed for project execution and completion. Efforts on the part of all parties involved throughout each phase of the construction process were presented.

All techniques discussed may not be applicable in every situation or on every project, but it is up to the owner, the architect/engineer, and the contractor to apply these techniques as applicable to achieve the goal of delivering the project at the economically optimal time.

The determination of the least cost construction schedule can maximize a contractor's profit. A methodology has been presented to find the minimum cost schedule--with a variety of compression procedures to determine the time versus



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direct cost curve. All of the methods will lead to the same time-cost curve. Since schedule compression can be a time consuming task, a method should be selected that is easiest to use and follow. This report has recommended two of eight methods studied, based on their simplicity, understandability, and applicability to projects of all sizes. Table 1: Characteristics of Change and Rework

> Des. Purposes Object Scope of Triggering Work Another Changes Vary, depending on Managerial Minimizing the impact of Preceding or May trigger succeeding Changes changes that have already occurred by adopting a tasks sensitivity different method or process than in the original plan and specification. Rework Achieving what are originally intended in the The Same as the None problematic scope of plan and specification. tasks problematic tasks

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