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Scheduling and Monitoring of Water Supply Project at Jabalpur Using Management Tool Primavera

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ABSTRACT

Implementation of construction project needs a proper planning and scheduling is of vital importance for the project to be executed and run smoothly. A best schedule has to be prepared in such a way that meets the primary objectives of the total project. Those primary objectives are to create a quality project, completed on time, within budget, and in a safe work environment.

Hence in this study an ongoing construction project is taken and the execution of the project is compared with the schedule with the help of Primavera P6. An ongoing water supply project in is selected and the activities pertaining to the preconstruction, substructure and superstructure is considered for comparison. From the study, it is found, how the project is planned, the sequence of work and linking relationships between activities for the whole project.

This research is based on secondary as well as primary data. This investigation highlighted scheduling of PAYLI MULTI VILLAGE RURAL WATER SUPPLY SCHEME, DISTT. JABALPUR, NARSINGHPUR AND SEONI" for ultimate capacity of bringing 71 mld treated water (23 hours of pumping) from the backwater of Bargi Dam on river Narmada to 638 villages of Jabalpur, Narsinghpur and Seoni districts in Single Package.

Keywords : Primavera, Gantt Chart, Time-Cost Comparison, Cpm Network, Tracking, Project Scheduling.

I. INTRODUCTION

In the developing world more than a billion people are facing a lack of safe drinking water. Approximately three billion people live without access to adequate sanitation necessary for reducing exposure to water related diseases. Poor water quality continues to be a major threat to human health. Approximate 4.1 percent of the total global burden of disease due to Diarrhea and is responsible for the 2

million people deaths of every year. Water and water resources are very important for maintaining a productive environment for all living organisms. Due to human populations and economies grow; global water demand has been increasing rapidly. Global population increase and lifestyle changes are growing pressures upon water resources leading to widespread water stress in many countries. As a result there is urgent need to conserve water for future. Actually water influence living standard as well as health status. Water is crucial substance for all living thing not only human beings, so every decision and every step to be

Project Management

Primavera Systems, Inc. was a privately held company that developed Project Portfolio Management (PPM) software to assist project-intensive organisations in identifying, prioritising, and selecting project investments as well as planning, managing, and controlling projects and project portfolios of all sizes. Oracle Corporation became the legal owner of Primavera on January 1, 2009. Joel Koppelman and Dick Faris launched Primavera Systems, Inc. on May 1, 1983. It was a private corporation situated in Pennsylvania (USA) that developed Project Portfolio Management software. Primavera purchased Eagle Ray Software Systems in 1999, Evolve Technologies (a professional services automation provider) in 2003, Pro Sight (an IT portfolio management software vendor) in 2006, and Pert master in the same year to help expand its product capabilities (a project risk management software vendor).

Fig 1 Stages of Project Management System

Review of Literature Summary

Archana Sen et.al (2022) objective of the research paper was to investigate the status of water resource and water supply system in Bhopal city in order to analyse the quantity and quality of water supply and further investigate the issues and challenges about water resource in the city. Area wise survey has been conducted with the help of a structured interview schedule along with purposive random sampling technique used here, from different areas of Bhopal city like slum and non-slum 42 sampling points are selected for primary survey. Sample size was 400, sample distributed in two major parts 144 slum and 256 non slum according to basis of slum and non slum household proportion.

The paper elucidates that water bodies are being polluted which needs great concern to its protection. The main problem found in quality of water of colour smell taste and also in the quantity of water. There should be different arrangement of sewage line so that sewage water will not enter in the freshwater body because it affects both aquatic as well as human life. As per the study the slum are suffering to much because the drainage system and water supply system are passing through the same channel in case of leakage in supply line the drainage water gets mixed and makes the water contaminated and prone to diseases. Government authority should keep eye on the status of water body so that in the future we may not made water crises.

Roma Silawat and Rajendra Chauhan (2021) research paper aimed to evaluate water quality of "Kaliyasot River '' for a period of one year 2018-19 in summer, monsoon and winter seasons. The samples were collected from different sampling points. The parameter detected were temperature, turbidity, pH, electrical conductivity, total solids, TDS, SS, nitrate, phosphate, chloride, alkalinity, total hardness Ca-H, Mg-H, DO, BOD, COD, K, Na , sulfate and fluoride all physico-chemical parameters.

The analytical result of different physico-chemical parameters stated that Kaliyasot river water was affected by various anthropogenic activities. Results concluded that the value of some parameters were beyond the permissible limit while some others were within the limit. The river is polluted but can be used for irrigation purpose.

Objectives of the research

'Planning and scheduling study of projects of similar type and alternative to be taken so that a new COST-TIME relationship can be established which is OPTIMUM''. The salient objectives of the present study have been identified as follows:

- To achieve better command over various activities so that various losses of resources may be minimized.
- To carry out the project in a fixed time with most efficient utilisation of manpower.
- To make study based on requirement of manpower for different activities of project according to IS-7272 & analysis of rate using PRIMAVERA P6 (project management software).To deliver the construction project within scope, time, cost and quality
- To obtain schedule delay analysis of project at any time.
- To prepare resource allocation for individual activities as per I.S. 7272-part-I.

Steps of Analysis

A. Plan Iteration

Iteration implies doing the same thing more than once. In planning, iteration implies returning to an analysis when more information is available, when a different level of detail is necessary, or when new evaluation techniques have emerged. The planning process is one that is improved when it is performed more than once. This not only implies that reviews improve evaluations, but that the level of detail of evaluations is likely to change during the planning process. Planning is not a simple linear process.

Any process that encourages feedback from stakeholders will naturally require some degree of iteration. Feedback typically creates new information or helps to identify new priorities or areas of increased interest. Incorporating this information improves the quality of a plan if it is considered.

B. Screening

Screening is a basic systems engineering concept. Screening is the process of iteratively examining alternatives to select those which will receive further consideration and those that will not. A principal goal of screening is to effectively reduce the quantity of detailed analysis that is necessary, without eliminating alternatives which should be evaluated fully.

Screening does not imply full evaluation and ranking, it implies making use of expertise and sound judgment to use one's time effectively. Without some form of screening, almost any water resource planning effort would become too complex and intricate to accomplish. With screening, promising alternatives are provided an opportunity for full evaluation and inferior alternatives are excluded from further evaluation.

C. Scoping

Scoping is also another basic systems engineering concept. Scoping identifies the boundaries of the problem to be addressed and the boundaries of the solutions to be considered. Scoping is particularly

important in evaluating water resources planning because the National Environmental Policy Act defines scoping as a required process. In that act, scoping is defined as "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." Scoping has been used in many studies as a formal procedure to ensure the input of stakeholders in the planning process.

D. The Seven Step Planning Process

The seven step process described here is an example of a "disciplined, iterative process." This implies that all steps must be performed and recognizes the natural feedback that exists between all steps. The number of steps and their boundaries are less important than the general planning philosophy, that is, good water resources planning involves carefully defining the challenges faced, defining the planning environment and including all those that might impact or be impacted by the plan, creating a comprehensive and creative set of alternatives for addressing the challenges, selecting among those alternatives the one plan that best addresses the objectives and constraints of the challenge, and creating an comprehensive approach to implementing that plan. Each of the seven steps is described below.

Fig 2 Water Resource Planning Process

Step 1 - Identify Problems and Opportunities

One of the most important and most neglected aspects of planning is a careful consideration of the problems presented and the opportunities to address it, and the translation of these into planning objectives. Good planning begins with well defined planning objectives. A planning objective is a concise, formally structured statement that defines what a plan should accomplish, describes the geographic and temporal scope of the plan, and identifies who the plan will impact. Planning objectives are created to focus the study on the problems of greatest concern, ensure that multiple goals are explicitly considered throughout the process, help create a common vision of the process, and allow evaluation of the effectiveness of the plan. Planning objectives help direct study resources (time, dollars, talent) to the challenges and opportunities of greatest importance. Without accurate and well formulated planning objectives the planning process loses its focus, important interests are ignored, important problems are not addressed, effective alternatives are not formulated, plans cannot be evaluated, and implementation becomes impossible.

Initially, it would appear that defining problems and opportunities and translating them into planning objectives should be a simple process. Many planning objectives in practice have proven to be poorly conceived and a lack of attention has resulted in failed planning efforts.

Step 2 - Create a Planning Team

No plan can be created without participants, and the participants of a water resources plan will, to a great extent, determine the quality of the plan. Developing an appropriate and effective team to perform planning can be challenging. Team members must possess both individual skills and be able to work effectively in groups. It is important to remember that a diverse perspective broadens the view of the problem and results in better plans. Also, broad stakeholder representation is required if the plan is to be

implemented. In addition, good chemistry between team members is invaluable.

When creating a team, it is important to carefully determine who can best contribute to the success of the planning process. This requires not only the area of expertise of the members, but their role in plan implementation. When considering a potential team member, one can ask: Will their endorsement of the plan be required? Will they play a role in enacting the plan? Will they be impacted by the plan? Can they impede the plan? Do they possess skills, expertise, or a perspective that is needed in the planning process? Although creating a planning team has been listed as the second step of this process, planning teams help create planning objectives. Likewise, it is difficult to assemble an appropriate planning team without knowing the study objectives. These two steps illustrate the type of feedback and iteration that is common in water resources planning.

Step 3 - Create Inventories and Forecasts

This step in the planning process requires a careful definition of the "status quo" and forecasting future conditions. In this setting, the status quo is defined as the existing and anticipated conditions of a water resources system if the planned policies, system configurations, regulations, and management strategies remain unchanged. The purpose of creating inventories and forecasts is to create a shared and accepted understanding of the physical, technical, regulatory, management, and policy attributes of the system; create a statement of important problems facing the region; identify the uncertainties and discrepancies in information available; and catalog, to the extent possible, the polices governing system operation.

a) Inventory

There are a variety of components in a system inventory, including a facilities inventory, resource inventory, economic inventory, management inventory and demand inventory. Facilities inventories catalog all of the major facilities in a basin including reservoirs, distribution facilities, treatment plants, pumping facilities, diversions and water-related structures, such as boat ramps, docks, and locks.

Resource inventories include all of the natural features in the study and might be characterized as physical features and aquatic/terrestrial features. Physical features include the study area's climate, hydrology, unregulated streamflow, gaging station locations, local flows, precipitation, snow fall, evapotranspiration, and groundwater resources. Aquatic and terrestrial features include all fish and wildlife, threatened and endangered species, water quality, fish needs, and locations of effluent discharge. Legal inventories include authorized purposes for all existing projects; existing water rights and priorities; instream flow requirements; water quality regulations; and other federal, state, and local law impacting the management of the system.

Management and policy inventories include operating policies for existing or planned facilities, rule curves for reservoirs, triggering mechanisms for management operation, management preferences, societal preferences, and political concerns. Economic inventories include facility capital and operating costs, recreational benefits, marginal cost of resources, and past benefit/cost analysis.

Demand inventories include explanations of water uses (instream, offstream, consumptive, nonconsumptive), current and forecasted demand levels, demand patterns, driving factors, cost of water, conservation strategies, curtailment measures, and revenues generated.

b) Forecasts

Forecasts are necessary to evaluate the effectiveness of water projects in the future. If conditions in a study area are stable, sometime forecasts can be made with great confidence. More often, however, forecasts must be made in rather dynamic conditions knowing that the parameters being forecasted (rate of population growth, future environmental regulations, response of

endangered species to increases in instream flows) are based on an artful combination of expert judgment and incomplete information. This does not diminish the value of forecasts, as reasonable forecasts based on sound analysis of limited information are certainly superior to planning with no forecasts. It is important, however, to acknowledge the uncertainty inherent in forecasts and to make every attempt to propagate this uncertainty through any quantitative assessment that is made.

Step 4 - Formulate Alternative Plans

The formulation of innovative solutions to water resource challenges is one of the most difficult and complicated components of the planning process. All too often creative, novel and effective solutions to problems are left undiscovered while inferior and routine alternatives are chosen. A balancing act is required between the cost and time needed to develop a variety of appropriate solutions, recognizing that each potential alternative will require time and resources to evaluate.

A first step in formulating alternative plans is the process of creating measures of performance for evaluating alternatives. (This step could be considered a separate step entirely, as important as the seven steps presented here.) Performance measures must be clearly defined, easily understood, directly related to planning objectives, relevant to decision makers and stakeholders, and capable of addressing risk and uncertainty. There are typically two types of performance measures: performance accounts (describing the overall effect of an alternative in a specific area) or metrics (describing statistical or numerical measure of system performance). For federal projects, four categories of performance measures are used: National Economic Development (NED), Regional Economic Development (RED), Environmental Quality (EQ), and Other Social Effects (OSE - effects that are not reflected in the other three categories). Often defining measures of performance is helpful in beginning the alternative formulation process.

The general alternative formulation process is an iterative one. Alternatives should be presented initially as general concepts or approaches without too much detail. This provides the opportunity to explore alternatives and to adjust and modify them freely before they progress into more formalized concepts.

Step 5 - Evaluate Alternative Plans

An alternative plan should be evaluated based upon its success in addressing planning objectives effectively. Infeasible alternatives should be discarded when they are proven to be impossible or impractical. Inferior alternatives should be identified, although not discarded immediately in the early stages of planning, as during the alternative generation process some constraints identified as impinging on an alternative may be later relaxed. Promising alternatives should be noted and analyzed in greater detail as the planning process proceeds.

Typically, a top-down approach is used in the evaluation process that includes iteratively screening and selecting projects for further analysis. This process is applied with increasing concentration on increasing the detail of the analysis and evaluating the project's effectiveness, efficiency, and acceptability.

Plan evaluation involves not only exploring the impacts of a plan, but evaluating how changes in a plan impact its effectiveness. Essentially, the analyst is required to perform trade-offs of both the assumptions of the plan and of the goals of the plan. Within other fields of planning and analysis this analytical process is termed "trade studies" analysis. This suggests parametrically exploring the response of a system to changes in input or transformations. In these studies, it is extremely important to emphasis the life-cycle of the project and to ensure that a consistent period of evaluation is used for comparisons.

Step 6 - Rank Alternative Plans

In the process of ranking alternative plans, the analyst incorporates preferences into the analysis. These preferences reflect the relative importance of the planning objectives of the study and the planning constraints. It is not the role of the analyst to incorporate his/her preferences in the evaluation process, but rather to ensure that the preferences of the decision makers and the stakeholders are incorporated. In addition, a full range of potential preferences should be included to ensure that those making the decisions have identified "Pareto optimal" solutions. When ranking alternative plans, it is important to recognize that both analytical and subjective comparisons are important. In analytical evaluations, quantitative scores based upon how well the alternative can meet a planning objective can be calculated. By their nature, subjective evaluations are less amenable to quantitative analysis, although a variety of quantitative techniques have been used to bring some level of quantitative analysis to subjective evaluations.

Throughout the ranking process, it is important to recognize that the goal of this process is to develop a ranking of alternatives or group of alternatives that can be displayed, debated, adjusted, and in the end adopted. This process involves not only the analytical evaluation of plans, but the process of seeking consensus among those who will eventually implement the plans, the ability to modify plan alternatives to address concerns that arise, the ability to incorporate new information as it becomes available during the planning process, and full recognition of all of the planning objectives and constraints and their relative importance.

The process of ranking alternative plans requires equal portions of communication, cooperation, compromise, and ingenuity among those engaged in the ranking process. It is at this stage in the planning process that deficiencies in all of the previous stages of planning become obvious. Although planning is an iterative process, it is important that the other stages of planning be revisited and more analysis be performed only if this significantly changes the ranking of projects and thus the selection of a different preferred planning alternative.

Step 7 - Plan Implementation

Once a planning alternative is chosen, the next step is implementation. Implementation is the cornerstone of plan success, as a plan can truly only be successful if it is implemented. It should be noted that a strategy for implementing a planning alternative must be part of the plan. As through all of the planning steps described here, implementation is iterative and interlinked with the other planning steps.

Plan implementation requires a commitment to success, as the process if often long and difficult. Successful plans are technically and politically viable; they contain a clear definition of the roles of agencies and individuals, and have a clear mechanism of formal and informal endorsement. Successful plans also address clear mandates, are not based upon "wishful conditions" that do not reflect reality, include careful interagency coordination, have sufficient resources and have broad based endorsement.

Case Study

The project for thesis work is PAYLI MULTI VILLAGE RURAL WATER SUPPLY SCHEME, DISTT. JABALPUR, NARSINGHPUR AND SEONI" for ultimate capacity of bringing 71 mld treated water (23 hours of pumping) from the backwater of Bargi Dam on river Narmada to 638 villages of Jabalpur, Narsinghpur and Seoni districts in Single Package

- The construction of proposed structure is taking place under supervision of theme engineering services.
- The total project amount was INR 62260.00 Lakh with an estimated time period of 30 months (inclusive of rainy seasons).

II. Results and Discussion

Table 1 Project Duration

Project duration in Days	
As per schedule	As per proposed
379	224

Discussion: The project duration is defined as per proposed and as per the scheduled data set. The time duration is compared for the actual data and the data set as per Primavera P6. As per the chart it seems that the human resources are not used efficiently and not assigned tasks in an effective manner. Hence, the progress of project isnt upto mark.

Table 2 Direct Cost in Project

Direct Cost in lakh (Rs)	
Schedule	Proposed
20.18	14.9

Discussion: The direct costs of a project are the costs of labour, materials, and equipment, among other things. These construction project prices are estimated based on a thorough examination of the contract activities, construction method, site circumstances, and resources. The direct cost is 28 % higher in the scheduled cycle when comapred to the proposed time lapse. Here the recommendation states use of concrete plant on site in order to reduce the time and transportation associated charges.

Table 3 Pre construction Work

Project duration in days		
Activities	**Scheduled**	**Proposed**
Start milestone	0	0
Work order	40	40
Working drawing	30	30
Clearance	10	8
Marking	10	8
Site office	15	11
Labour room	10	6
Laboratory setup	10	5
Marking alignment	1	1
Total Duration	126	109

Table 4 Structural Activities

Project duration in days		
Activities	**Scheduled**	**Proposed**
Survey	25	22
Excavation	35	30
Phase wise inventory placement	30	25
Pipeline Connection	20	10
Storage	25	10
Treatment Plants	5	5
Testing	36	32
Total Duration	176	134

Table 5 Project Duration in Finishing Work

Project duration in days		
Activities	**Scheduled**	**Proposed**
Welding	5	5
Joint fixation	5	5
Oxide Coating & Paint	12	10
finish milestone	0	0

Project Scheduling

Step-1: First step involves the creation of EPS (Enterprise Project Structure) for the structure of the organization and definition of their job roles.

The company profile is defined in WBS and the associated resources are presented in hierarchy as per tree structure, for example, manager, team leaders and other associates.

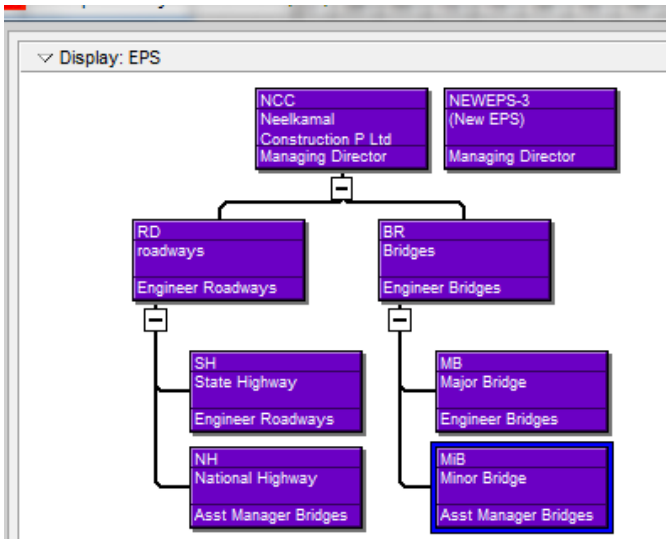


Fig 3 Project Structure

Step-2 The jobs roles are defined as per the organizational structure in company management.

The job roles are defined for the three different stages as per pre construction substructure and superstructure and proceed towards final work. Here the resources are allotted and defined for the project as per task allocation.

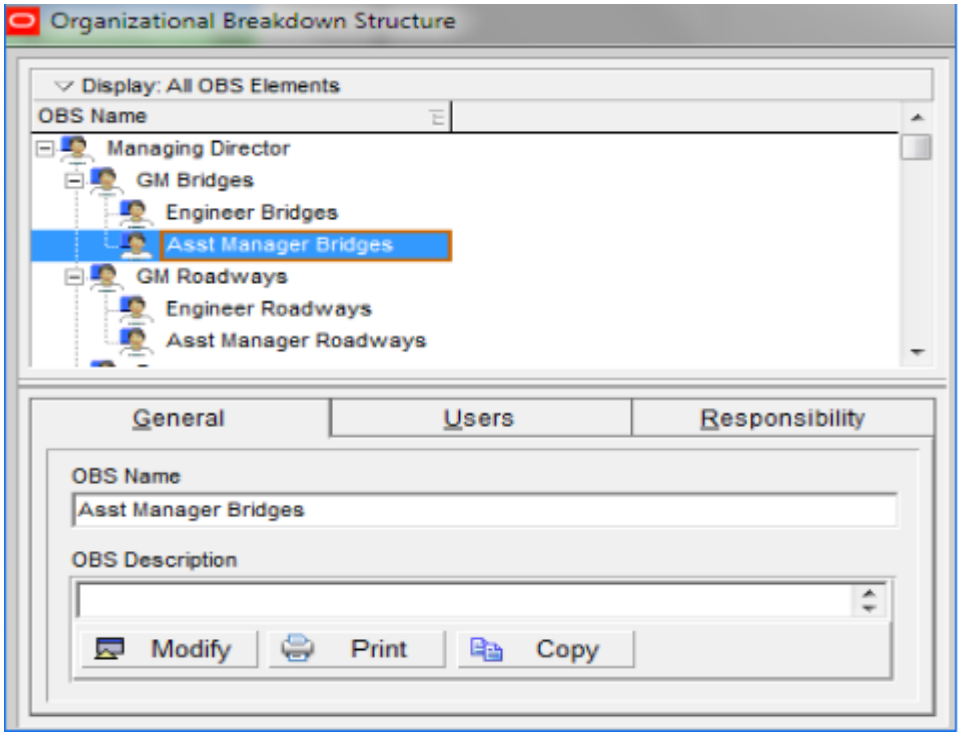


Fig 4 Assignment of Role

Step-3 The calender is defined as per the working days and shift timings for the project:

The activity list is entered and the calendar is characterised and used to display the working time for each action in the task before the project begins. Calendars are also used to describe the working and occurrence design during the course of a project. Global, Venture, and Customized schedules are three different types of timetables. The working shift is 8 hours long, and there are six days in a week. The working hours for point to point are 8:00 a.m. to 5:00 p.m. From 12:00 p.m. to 1:00 p.m., there is a one-hour meal break.

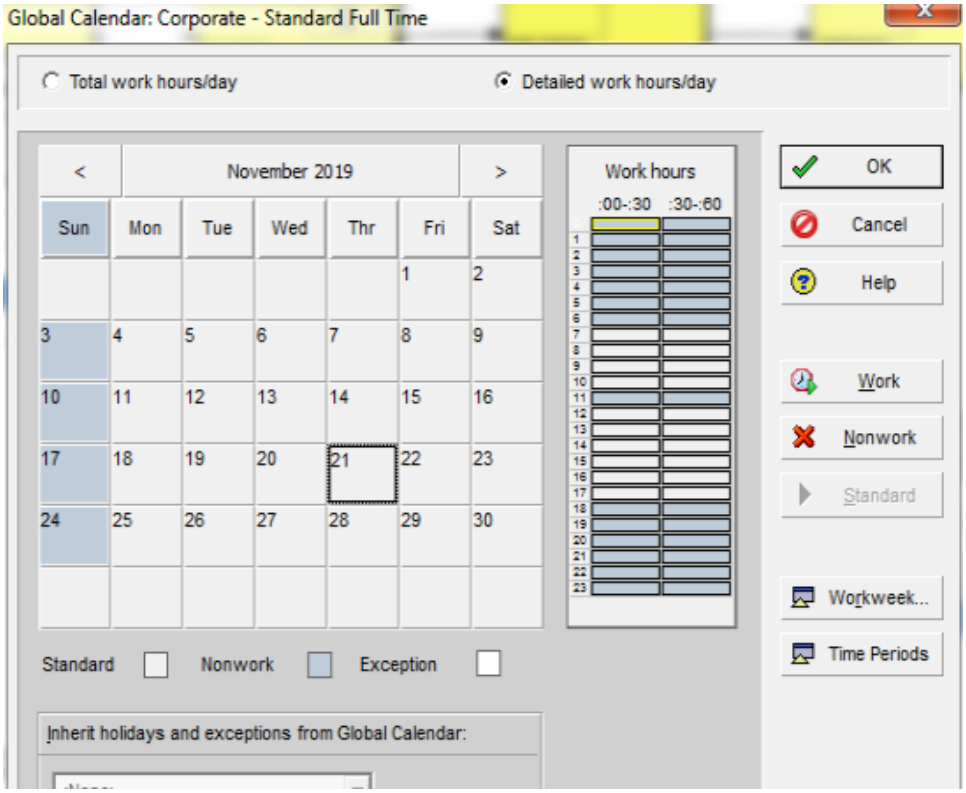


Fig 5 Global Calendar

Step 4- Work Breakdown Structure Preparation

A work breakdown structure (WBS) is the sequence of tasks that must be completed in order to complete a project. WBS is divided into tiers of work, starting with the final task and progressing to the development of different forms into distinct work components. WBS is calculated depending on the individual sub-project, and the completed WBS is as follows:

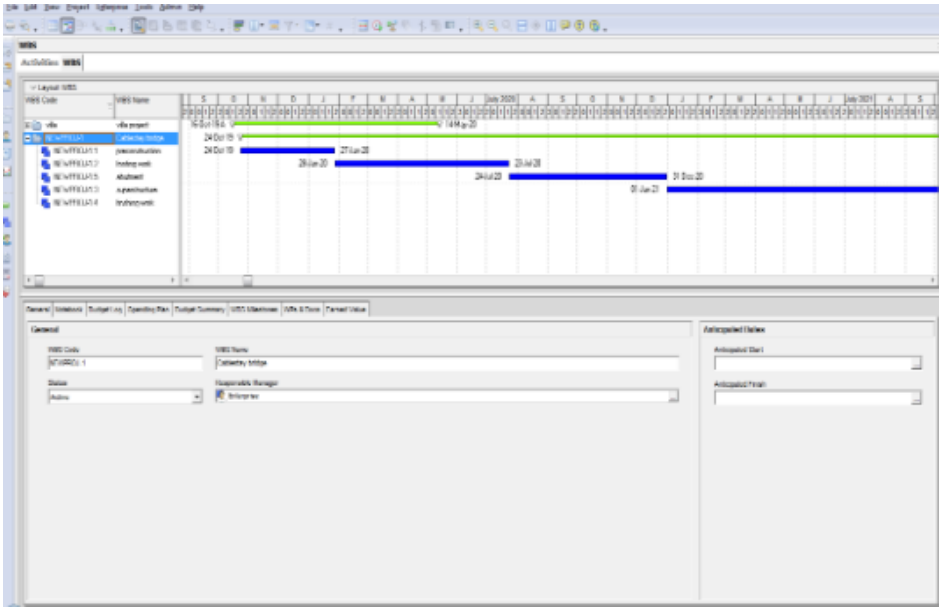


Fig 6 WBS Structure

Step 5- Assigning activities of each WBS as per scheduling data with links in between activities using Gantt chart.

The ability to identify the activities required to complete the assignment, as well as forecast or evaluate the number of days required to complete the project, is a critical step in the project planning process. Meetings, research, estimating, and costing procedures are used to evaluate the duration of the activities. Every activity has a set of lengths that must be adhered to. Because the task is time-consuming, it is necessary to use CPM as a PP equipment to determine the strategy.

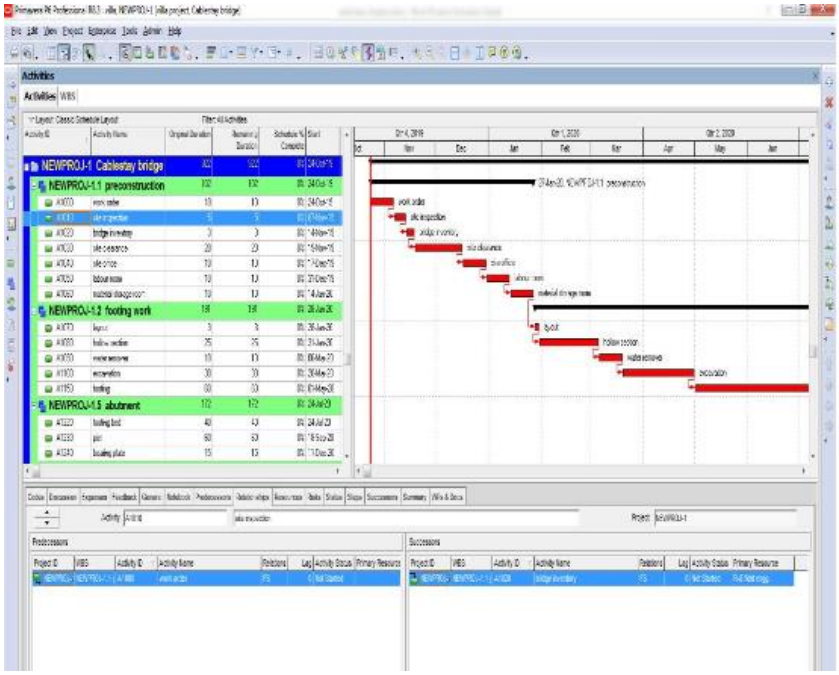
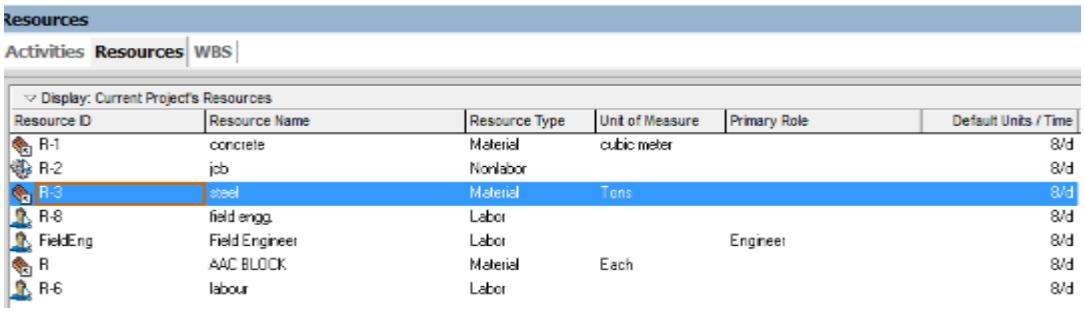


Fig 7 Activity List and Dates

Step 6- Gathering Materials (Manpower, Machinery and Material) The assets are created with the help of significant company assets, and users have the option of adding new assets. The cost of assets is determined by its unit, much as the cost of labour is determined by daily earnings, the cost of materials is determined by their weight, and the cost of machinery is determined by its working hours and maintenance.



Resources

Activities | Resources | WBS

Display: Current Project's Resources

Resource ID	Resource Name	Resource Type	Unit of Measure	Primary Role	Default Units / Time
R-1	concrete	Material	cubic meter		8/d
R-2	job	Nonlabor			8/d
R-3	steel	Material	Tons		8/d
R-8	field engg.	Labor			8/d
FieldEng	Field Engineer	Labor		Engineer	8/d
R	AAC BLOCK	Material	Each		8/d
R-6	labour	Labor			8/d

Fig 8 Resource Analysis

Step 7- Assigning Resources in each activity as per IS. 7272

IS 7272 establishes an inexact labour requirement based on the assigned activity. It provides consistent working labour based on the type of work; this code is based on the requirement of work for exercises based on the jobs required for usage.

Step 8- Comparison of scheduling proposed as per site scheduling using Primavera P6. Primavera also has a tool called Project Scheduling that may be used to compare standard and current work progress. It provides

legal booking and checking of all last-minute exercises, as well as managing and examining several aspects.

Project Tracking, Controlling and Monitoring

Creating Target Projects

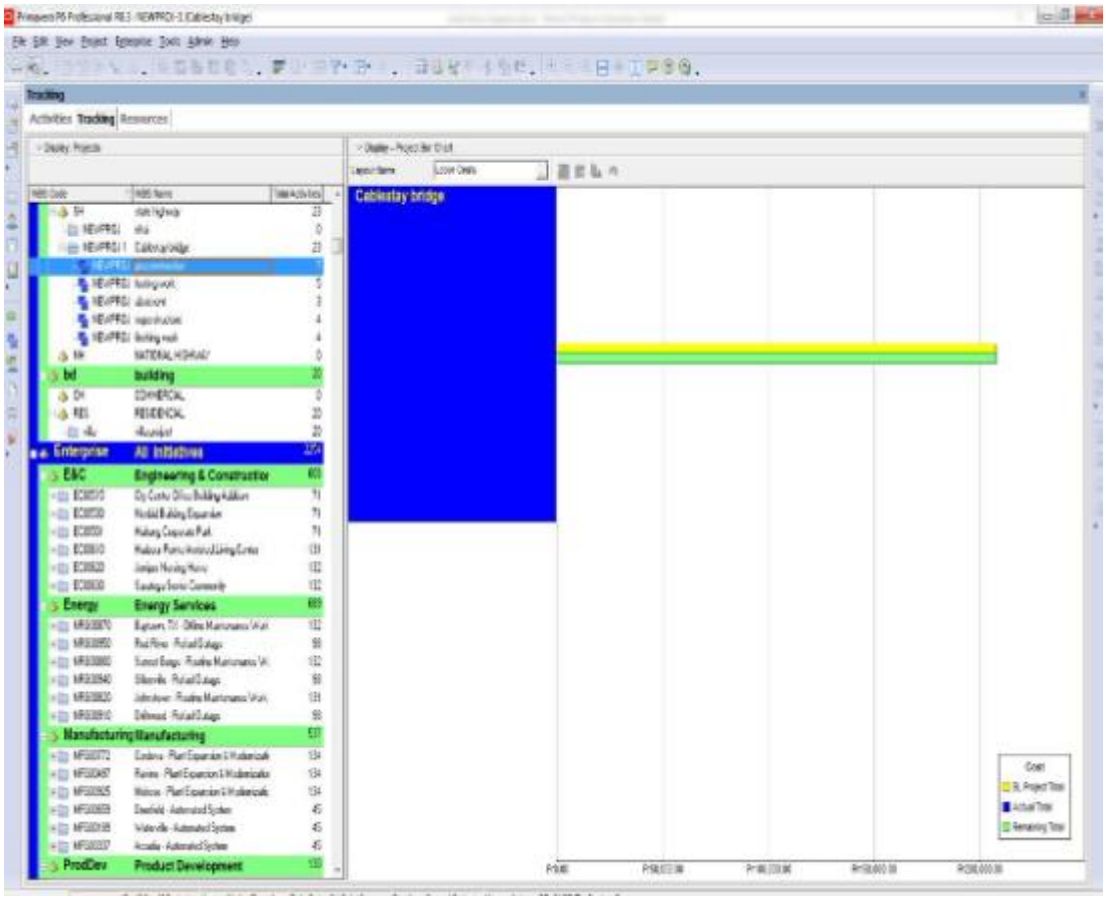
Starting point is a full duplicate project plan that can be compared to the current schedule to gain access to advance. And, before renewing the calendar with an out-of-the-blue dependable benchmark, the baseline is used to compare the deadlines, assets, and expenses for the current calendar to those for the previous calendar.

Updating Current Projects

When project management has to record advancements on the current information date, prerecorded in advance of information is recorded. It recalculates a schedule based on the proper Date difference, and any modifications are simply noted. There are a number various ways to replace the timetable, including workouts and assets that may be refreshed independently and used in the same way. This will enable the creation of the most appropriate restoratives milestone by predicting the impact of unanticipated situations.

Tracking of the Project

Undertaking administration in the same way that effective task general managers, managing directors, and other ventures are taken into account. This is also where they go into detail on how the actual results compare to the original plan. Not in a mechanical information dump where one can simply recite information, but in task administration following a certificate. The project management follow-up technique typically determines your viability as a venture director. Staying prepared with planned corrective activities to address changes to the job arrangement and calendar is essential. The introduction of those alternators will assuage the concerns of the venture's officials and investors.



Tracking of the Project

Project Planning

Arrangements can be defined as a visual representation of a strategy or plan for ongoing activity creation prior to the start of a project. This is the process of considering numerous solutions and approaches that can be employed to do the task quickly. Characters characterise the standards to be followed in carrying forward the arrangements and show a definitive manner of the end, while the arrangement creates a deliberate sequence of events. It assists the supervisor by identifying the tasks that must be completed, the timeline that must be followed, and the extent to which each activity must be completed, as well as assigning the right supervisor.

The plan's goal is to keep asset consumption to a minimum while yet completing a task satisfactorily. Organize a task for making efficient use of equipment, materials, and labour and ensuring easy effort. Continuous monitoring of project progress is required for successful project management. An experiment of applying analytical advancement to planned tasks allows the director to spot problems early and allows for the improvement of revised plans to provide the best possible path to the goal. The development of arrangements is done in this way in the first step of the venture administration.

III. CONCLUSION

In this Project the water supply is being considered for considering jabalpur, Seoni and Narsinghpur geography as per PAYLI MULTI VILLAGE RURAL WATER SUPPLY SCHEME for ultimate capacity of bringing 71 mld treated water (23 hours of pumping) from the backwater of Bargi Dam on river Narmada to 638 villages of Jabalpur, Narsinghpur and Seoni districts in Single Package. By considering all the things like Total Quantity of work, Productivity of different labour sections, Availability of both material & Labour Resources, Field conditions, methods adopted for construction, Actual Risks that is going to come during execution etc., the Schedule is being prepared by using Primavera P6 consists of path in which each and every activity have to be proceeded step by step with time in the form of dates for its completion. The Schedule is a final product which is an amalgamation of WBS with sequence of activities with their logical relationships, quantity of Resources within the time.

The research presented a plan of 300m bridge situated in kamla park Bhopal (M.P). This report presents the reason behind the delay in completion of the project. And further the scheduling and allocation of resources in performed using project management tool Primavera P6. Minimization of delay is monitored and controlled as per IS 7272 Part I.

The conclusion derived from the research are stated below:

Cost Variation

The project duration is defined as per proposed and as per the scheduled data set. The time duration is compared for the actual data and the data set as per Primavera P6. As per the chart it seems that the human resources are not used efficiently and not assigned tasks in an effective manner. Hence, the progress of project isnt upto mark.

Direct Cost

The direct costs of a project are the costs of labour, materials, and equipment, among other things. These construction project prices are estimated based on a thorough examination of the contract activities, construction method, site circumstances, and resources. The direct cost is 28 % higher in the scheduled cycle when comapred to the proposed time lapse. Here the recommendation states use of concrete plant on site in order to reduce the time and transportation associated charges.

Indirect Cost

Indirect costs might be constant or variable. Personnel costs, security costs, and administrative costs are the three main categories of indirect costs. These expenses have nothing to do with the construction project. Due to delay in project, the salary of the project managers and site workers are running in delays which is increasing the costing of the project ultimately hampering the profits of the project. As the project is directly proportional to indirect cost. Here it was found that blocking of machinery has further added the cost which even includes the annual depreciation on the machinery.

Overall Cost

The cost of certain things in a construction project cannot be readily ascribed to a specific activity. The majority of the site-related costs are classed as project overhead costs in this section. Overhead costs for a project might be either fixed or time-related. Stores, safety facilities, workshops, offices, employees, and parking facilities are some of the things that go under overhead costs. This fee will cover all plants that are required to support the working personnel. A complete examination of the site-related activities and their costs is used to assess the overhead cost. As a result, a precise cost estimate is obtained. Overhead costs on the job site contribute for 5 to 15% of total project costs. In this project the overall cost of the project is monitored and regulated using project management tool primavera P6. the activities are monitored from beginning till the end of the task.

IV. FUTURE SCOPE

- This refers to the allocation of labour and assets, as well as the venture's planning. One can make a strategy and schedule for plant and machinery based on their costs or for the task's final development asset. In this investigation, proposed and scheduled data for a bridge is considered for comaprison.
- To expand the scope of the research, a planner and schedule of earthwork gradation for development and basic manner is gathered, and analysis is carried out using Primavera P6. This analysis can then be carried out using other management programmes.

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