Chapter 1

Introduction

1.1 General

A Project is a temporary endeavour designed to produce a unique product, service or result with a defined beginning and end (usually time-constrained and often constrained by funding) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value.

Project management is the discipline of carefully projecting or planning, organizing, motivating and controlling resources to achieve specific goals and meet specific success criteria. Project management includes developing a project plan which includes defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved, quantifying the resources needed and determining budgets and timelines for completion.

Project management has become a fundamental way for organizations to optimize processes, ensuring that they offer the highest level of efficiency and effectiveness while carrying out projects throughout the company. Project management (PM) software are one of the most helpful tools that can assist project managers in being as effective as possible, regardless of the industry through improvement of processes.
1.2 Aim of the Work

To learn project management software Primavera p6 (PV6) and apply the same for the Scheduling and Monitoring of a Multistoried Building.

1.3 Objectives of the Work

The main objective is to learn PM software Primavera (PV6), apply the knowledge gained for preparing project schedule of a live project and improving the actual pace of work on site by incorporating the suggestions provided by PM software. Pursuant to this, following objectives are proposed for this piece of work:

- Understanding and analyzing the process of managing a project.
- To understand the process of scheduling and monitoring a construction project using conventional methods (Critical path method (CPM) and Programme evaluation and review technique (PERT)).
- To learn the process of scheduling and monitoring a construction project using PV6.
- To procure CAD drawing of the proposed site
- To use PV6 for scheduling and monitoring of a Multistoried building
- To identify the merits and demerits of PV6.
- To monitor the progress of the site under consideration with respect to the schedule prepared with PV6.

1.4 Scope of the Work

In view of the fore mentioned problem as specified from the literature review, following scope is outlined for the present investigation.

- The scope of the project is to compare the applicability of PV6 for Scheduling and Monitoring of Multistoried Building.
1.5 Expected outcome

• Understanding of independency and interdependency of activities involved in a project.

• Knowledge of project scheduling and monitoring process.

• Know how of preparing a project schedule using conventional methods and PV6.

• Preparing the project schedule for the Multistoried building.

• To prepare a report on the basis of the work done.
Chapter 2

Review of Literature

2.1 General

Time and cost over runs due to inadequate project planning, improper implementation and lack of proper management during execution are certain major issues faced by construction industry today. These issues are many times responsible for increase in project cost (in certain circumstances 30-35% more than budgeted cost).

Good planning adequate organizational machinery and sufficient flow of resources are the pre-requisites of an efficient project but not without a warning mechanism which will alert the organization about its SWOT (strength weaknesses opportunities and Threats). Project monitoring is the process of doing the same.
2.2 Overview of Literature Review

Many studies have been carried out for making project management more effective using software's and techniques. Normally, we need to refer to drawings and schedules separately as there is no dynamic linkage between these two. This proves to be a cumbersome job when the project involves thousands of activities. Further it becomes difficult to understand, communicate and discuss within the different project teams.

Dezeng et al. (2005) developed Network Builder Assistance (NBA) which help schedulers to build a preliminary schedule based on predefined module that comprised standardize activities and pay items, it can also be used to address schedule integration issues among multiple contractors & clients multiple management levels. They also developed an automated schedule review system called Network Review Assistance (NRA) which can identify potential schedule errors using rule based reasoning & suggest possible corrections using cased based reasoning.

The integration of PM software's like MSP and PV6 becomes difficult due to the requirement of coding within different programming environment. Further the updating of network and the scheduling computations on the modified data is a time-consuming process.

Kolagotla (2009) carried out study on GIS application in Project management. The study shows that different project members may develop inconsistent interpretations of the schedule when reviewing only the CPM schedule. This causes confusion on many occasions and usually makes effective communication among project participations difficult. He has underlined the significance of GIS system that allows project planners and managers to view in detail the spatial characteristics of the project.

Tom and Paul (2013) have emphasized on the effectiveness of primavera for project monitoring and control. Initially they have studied all the activities, their sequence of occurrence, duration, resources required and cost involved. The Organizational Break Down Structure (OBS) of the company executing the work and
the Work Break Down Structure (WBS) of the project are analysed to know the extent of the project later an earned value analysis has been carried out to get an idea about the resources involved and financial aspect of the completed work.

Bansal (2014) evaluated that Pre-construction planning begins after a project is awarded to certain point in time before a construction project starts. It is a macro-level planning for design review, finalization of the execution sequence, constructability analysis, site planning for major organization, logistics planning, and required major equipment. It minimizes risks, material wastage and overheads, and maximizes productivity during the construction stage. The major issues such as site access, locations of various facilities, and storage area required are resolved with respect to the project constraints.

Park et al. (2014) developed a system to estimate the construction cost, land acquisition cost, and operation & maintenance cost for the road construction project during a feasibility study using GIS. Their study also showcase that Pre-project planning is an owner driven planning process for gathering sufficient information about the potential risk as well as probability of success. It is equally important as compared to the actual construction planning & scheduling of a project.

Subramani and Chinnadurai (2015) have carried out a study on construction management and scheduling of residential buildings using primavera. It focuses on the comparison of different construction scheduling techniques available and emphasizes on effectiveness of primavera as project management software. They have underlined the significance of project management by calling it a road map which if properly followed leads to timely completion, customer satisfaction and most importantly project completion within the budget. They have also mentioned the step by step procedure of how primavera can be used for preparing the schedule of a project.
Polekar and Salgude (2015) have focused on planning, scheduling and tracking a residential project with help of Primavera software. They have demonstrated how the results generated, can be of help to the organization for enhancing its project planning skills for similar projects in future.

Jeoffrey B. Reyes (2010) has prepared a simple and easy guide for preparing a programme or schedule using software development kit (SDK). He has, with the help of a very simple small project, demonstrated how the data in spreadsheet can be imported to Primavera P6. It also provides a sample of bill of quantity (BOQ) and manpower tabulation for resources reference.

2.3 Summary

The advent of PM software's has revolutionized the methods of project scheduling. The review of literature has highlighted that construction project schedule can be effectively prepared using PV6. It is capable of graphical or pictorial representation as well as real time monitoring of the actual progress of work. This attempt has been made to make use of this benefit and compare the conventional and non-conventional methods of project scheduling and monitoring.
Chapter 3

Methods and Methodology

3.1 General

The methodology demonstrates the benefits of using PV6 for effective management of Construction project. In this Dissertation, attempt has been made to understand the effectiveness of PV6 in controlling and monitoring construction progress.

Successful project control is a challenging job as it involves many phases as shown in Figure 3.1 like Quality control, Problem solving and Risk Analyses etc. As such, effective project management is essential responsibility for all construction managers. Visualization of information is an important benefit for any project.

Fig 3.1- Project Management Phases

(Source: http://2.bp.blogspot.com/-Y-kDiateNzI/T9-wXtwZa4I/AAAA60/Z1GzksQLFos/s1600/Rule+of+7.png)
PM softwares give us a detailed plan & schedule of the works to be accomplished or executed as well as provide a pictorial representation making project execution and monitoring easier.

3.2 Effectiveness of PM Softwares

A variety of project management software are available and offer manifold advantages which can be listed as under:

- Effective real-time communication among different parties involved in a project.
- Document sharing and updation becomes easier.
- Project management software generally includes tools that can assist in managing project costs.
- Knowing project risks, creating forecasts and tracking budgets are some of the major advantages of project management software.
- Easy to use project management softwares allow for quick ramp-up times.

3.3 Project Management Softwares

Following is the list of PM software widely used:

1. Microsoft Project

It is a project management software program, developed and sold by Microsoft. It is designed to assist a project manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analysing workloads.

2. Smartsheet

It is an online project management, productivity and team collaboration software as a service application based in Washington. Its online project management tool works like a familiar spreadsheet, but with additional functionality including cloud-capabilities for sharing, attachments, integration with file storage services
and Gantt charts. Smart sheet combines functions found in Microsoft excel, project, access, and SharePoint into a single application.

3. Teamwork Project Manager (PM)

It is a Web based project management software for freelancers and small teams. Each project can have milestones, task lists and tasks, messages back-and-forth between team members (and clients), group editable documents, file sharing, and time tracking.

4. Mavenlink

It is a software-as-a-service company that provides software and services for advanced project management task collaboration ,resource allocation, work management and professional service automation.

Fig 3.3- User Interface of Maven link

(https://www.google.co.in/search?q=Mavenlink+images&client)
5. Project Kick Start’s

It is a wizard which prompts users to identify phases, goals, obstacles and personnel assignments for projects and uses a calendar to produce a Gantt chart that features the project’s phases and the goals, tasks and assignments for each.

![Fig 3.4- User Interface of Project KickStart](http://www.projectkickstart.com/products/)

6. Asta Power project

It is proven robust and scalable software, rated no.1 by the planning engineers Organisation for construction project management and planning 70% of successful UK construction projects for driven by Asta Power projects software including; The London Eye; the new roof at Wimbledon and emirates Stadium.
A very powerful project management tool. It is useful for civil engineers, main contractors, trade contractors, and house builders in creating fast plans, managing repeated task, recording and tracking costs, scheduling accurately and precisely, managing labour, plant and materials, and monitoring 'jagged progress' and 'as built progress' with tailored reporting as shown in figure 3.5 below:

![Figure 3.5 - User interface of Asta Power project](https://www.google.co.in/search?q=Asta+Power+Project&client)

The software enables you to proactively avoid cost delays and disruption on construction projects and if they do occur, to minimize their impact on the project, The client and on your business.

6. Primavera

Oracle's Primavera P6 Enterprise Project Portfolio Management is a powerful tool for global project planning and management of projects of any size with this cloud-based, robust, and easy-to-use solution.
3.4 Primavera PV6

Primavera Systems is the brand name (founded by Les Seskin, Dick Faris and Joel Koppelman) under which a range of software packages that collectively form a comprehensive enterprise project portfolio management (EPPM) solutions.

![Fig 3.6- User Interface of PV6](Source:http://www.qarticle.com/wp-content/uploads)

Primavera P6 is a software, which is used not just by planners, but also project managers, engineers, schedulers and anyone else involved in planning, management, reporting of a project. Primavera was, launched in 1983 by Primavera Systems Inc. and was acquired by Oracle Corporation- an technology company dedicated to creating the most innovative and useful software with around 4 lakhs customers worldwide since 2008.

3.4.1 Benefits of PV6

1. Reduces Risk

Using these softwares we can identify and mitigate risks in the course of planning, managing, and completing a project.
2. Easy to Use Software

We need to simply input the information, and wait for the software to determine if any problems exist. For example, worker shifts may be uncovered, have too many employees, or additional raw materials may be needed etc.

3. Optimized Resources

These softwares allow all involved in a project to carefully monitor resource availability and adjust such resources to meet project demands. Furthermore, the software can help identify areas where resource costs may be reduced by analysing resource trends & costs.

4. Forecasting of Project Activities

As a project evolves, the project may require additional resources, activities, and tasks to meet stakeholder demands. Within these softwares, project managers can create forecasts for resources, activities, and other project needs.

5. Tracking Features

The tracking features of these softwares allow users to rapidly generate reports, ensure all projects are completed as requested & maintain baseline adherence.

6. Enhanced Communication

Some project may span in large geographic areas, requiring hundreds of workers, and involving number of parties. These softwares enables executive-level staff to communicate with other workers, project managers, and planners easily. Furthermore, notes can be made to the schedule in the software to ensure all users to see the message.
7. Gives Employees Responsibility in Schedule Creation

These softwares make the scheduling and planning process easier by allowing users access to the schedule. Additionally, you may allow workers to create their schedules within the software from their location. Workers may also make schedule requests within the software, turn in timesheets, and perform other scheduling functions.

8. Breakdown Complex Projects

The size of a project can be overwhelming. allows project managers to break large projects into smaller, achievable projects, tasks, and activities.

3.4.2 List of companies of companies using Primavera software in India:

1. Larsen & Toubro (L&T).
2. Simplex
4. GMR.
5. Gammon.
6. Sterling-Wilson and many others.
3.6 Work Schedule

<table>
<thead>
<tr>
<th>Activity/Work</th>
<th>Planned completion time</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV6 Training</td>
<td>December 2016</td>
</tr>
<tr>
<td>Use of PV6 for preparing project schedule</td>
<td>Mid of Feb 2017</td>
</tr>
<tr>
<td>Comparison of PV6 schedule with conventional methods</td>
<td>Mid of March 2017</td>
</tr>
<tr>
<td>Preparation of final project report and presentation</td>
<td>End of April 2017</td>
</tr>
</tbody>
</table>

3.7 Summary

This Chapter describes the various project management tools available. It describes the merits and demerits of the same. On the basis of effectiveness of Primavera P6 application, its user-friendly interface and worldwide popularity, we have selected it for our B.E Dissertation.
4.1 Details of Project study area

We started our project by approaching M/s Quality HeightCon Pvt.Ltd.,Kurla,Mumbai.Since their projects were in running stage.they denied us for providing their list of activities and schedule.So,we requested them to provide us with the drawings of some completed project which was easily provided by them.The details of the same are as under :

<table>
<thead>
<tr>
<th>Name of Project:</th>
<th>Godrej Garden City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure details:</td>
<td>Stilt + 12 floor</td>
</tr>
<tr>
<td>Location:</td>
<td>Jagatpura,Ahmadabad,Gujarat</td>
</tr>
<tr>
<td>Name of Client:</td>
<td>Godrej Properties Limited.</td>
</tr>
<tr>
<td>Name of Contractor:</td>
<td>Simplex Infrastructure Limited.</td>
</tr>
<tr>
<td>Date of commencement of Project:</td>
<td>21st January 2014</td>
</tr>
<tr>
<td>Date of completion of Project:</td>
<td>2nd August 2016</td>
</tr>
<tr>
<td>Project Duration:</td>
<td>2.5 years.</td>
</tr>
</tbody>
</table>
4.2 Steps for preparation of a schedule in Primavera(PV6)

The steps involved in creation of a construction project schedule can be listed as under:

- Procurement of Drawings & List of activities from M/s Quality HeightCon Pvt.Ltd.
- Preparation of an excel sheet showing the quantum of work and the corresponding duration and resources required for completion of different activities involved in a project. For this, we took help from different experienced site personnel as well as textbooks related to Quantity survey and estimation.
- Installed Primavera PV6 in the laptop. Started the creation of a schedule for the given construction project. The detailed procedure of the same is mentioned below:

- Creation of an Enterprise project Structure (EPS).
- Creation of an Organisation breakdown Structure (OBS).
- Creation of an Work breakdown Structure (WBS).
- Creation of a new calendar
- Creation of Activities.
- Creation of resources and adding ie listing out resources to the activities generated.
- Assigning relationships to the activities.
- Assigning the listed resources to the different activities and allocating the number of resource units depending upon the quantum of work.
- Decided the required data columns to be displayed.
- Added duration to the respective activities. Set the baseline.
Scheduled the entire dataset and made the schedule to run as per the requirement.

Tracked the progress of different activities to know their status on a particular date.

Generation of different kinds of reports.

The detailed procedures of the steps mentioned above are mentioned in the paragraphs to come.

4.2.1. Creation of an Enterprise Project Structure (EPS)

The enterprise project structure represents the hierarchical structure of all projects in the database. The EPS can be subdivided into as many levels or nodes as needed to represent work at your organization. Nodes at the highest, or root level might represent divisions within your company, project phases, site locations, or other major groupings that meet the needs of your organization; projects always represent the lowest level of the hierarchy. Every project must be included in an EPS node.
Fig no 4.1: Screen shot showing creation of an EPS in Primavera P6

Steps to be followed in Primavera P6 for creation of EPS: (Refer Fig 4.1 above)

1. Choose Enterprise, Enterprise Project Structure.

2. Click Add.

3. Type an ID and name for the EPS node. In the Responsible Manager field, select an OBS element for the new element.

   4. If necessary, you can change the hierarchical position of the new element by clicking the arrow keys.

5. Click Close.
4.2.2. Creation of an Organization Breakdown Structure (OBS)

The organizational breakdown structure is a global hierarchy that represents the managers responsible for the projects in the organization. The OBS usually reflects the management structure of your organization, from top-level personnel down through all levels. An OBS element/person will be responsible for each node/project within the EPS. There should be ideally one OBS for the entire organization.

Fig no 4.2: Screenshot showing creation of an OBS in Primavera P6.

Steps to be followed in Primavera P6 for creation of OBS: (Refer Fig 4.2 above)

Step1: Click on enterprise.

Step2: Click on OBS, a window will appear.

Step3: Give OBS name.

Step4: Click Add.
4.2.2.1 Interlinking Between EPS and OBS

The OBS and EPS are combined together through the responsible manager field on the EPS structure, project folder and WPS level. The Responsible manager field is the OBS and this determines which users can have access to the project. When you create a user, you have to give them Responsible Manager assignments in order for them to see project. EPS and OBS need to have a one-to-one relationship. If you give a user a responsible manager assignment(OBS) that is not tied to an EPS, Project or WPS level, they will not see any project when they log into the Primavera Client application or the web Application.

4.2.3 Creation of a Work Breakdown Structure (WBS)

Work Breakdown Structure (WBS) captures all elements of projects in an organized fashion. Breaking down large, complex projects into smaller project pieces provides a better framework for organizing and managing current and future projects. WBS facilitates resource allocation, task assignment, measurement and control of project cost and billing. The WBS is utilized at the beginning of the project to define scope, identify cost centres and is the starting point to developing project plans/Gantt charts.

Steps to be followed in Primavera P6 for creation of WBS: (Refer Fig 4.3 above)

1. Choose on WBS from the left side panel.

2. Then Click Add.

3. A new WBS will be created

4. Add the systems and subsystems involved in the project.
4.2.4 Creation of a Calendar :-

In P6, calendar is used to define working and non-working days. This calendar data is then used in the process/calculation of scheduling. Tracking and Resource Leading.

Fig no 4.3: Screenshot showing creation of a WBS in Primavera P6.

Fig no 4.4: Screenshot showing creation of a Calendar in Primavera P6.
Steps to be followed in Primavera P6 for creation of Calendar : (Refer Fig 4.4 above)

1. Click enterprise - calendar.

2. Defining calendar, the calendar dialogue box will be opened as shown..

3. Set the appropriate Calendar from the calendar dialogue box.

Now there are three categories/type of calendar i.e. Global, resource and project as shown in figure 4.4 above.. Make sure that global check box is checked. click on Add button “select calendar to copy from” Dialogue box will be displayed.in this dialogue box, we have to select the base calendar which will be copied into our new calendar. This step is mandatory. Our new calendar will have all the working/non-working (days and/or hours) that the base calendar possesses.

4.2.5 Creation of Activities :-

Fig no 4.5: Screenshot showing creation of Activity in Primavera P6.
Steps to be followed in Primavera P6 for creation of Activity: (Refer Fig 4.5 above)

1. Click on the “Activities” icon in the Directory Toolbar.

2. Right-Click where you want to insert the new activity → "Add" OR Click the "Add" icon and follow the Wizard steps OR Click "Insert”.

4.2.6 Creation of Resources:

Fig no 4.6: Screenshot showing creation of a resource in Primavera P6.
Steps to be followed in Primavera P6 for creation of a resource: (Refer Fig 4.6 above)

1. Click enterprise, Resource.

2. Click on “Add”, a window will appear.

3. Add the resource by following the simple steps that are displayed.

4.2.7 Assigning relationship between Different Activities.

Fig no 4.7: Screenshot showing assignment of relationships between different activities in Primavera P6.
Steps to be followed in Primavera P6 for assigning relationship: (Refer Fig 4.7 above)

1. Select activity.
2. Click on activity details, click on relationships.
3. It will show predecessors and successors.
4. Then click on assign either predecessors or successors.
5. A window will appear, then double click on activity.

Normally, the following types of relationships exists between different activities:

1) **Finish-to-Start (FS):** This is the most common type of relationship where one activity cannot start until another associated activity has finished. An obvious example is that installation cannot start until demolition is complete.

2) **Start-to-Start (SS):** This is a relationship where one activity cannot start until another activity has begun. An example is that demolition cannot proceed until the safety plan has commenced.

3) **Finish-to-Finish (FF):** In this relationship one activity cannot finish until another related activity has finished. A possible example from the research industry is that documentation cannot complete until experimental testing described by that documentation has finished.

4) **Start-to-Finish (SF):** In this not so common relationship one activity cannot finish until another activity has begun. An example is the use of a generator that cannot cease until the power is activated.
4.2.8 Assigning resource to different Activities.

**Fig no 4.8:** Screenshot showing assignment of resources to different activities in Primavera P6.

**Steps to be followed in Primavera P6 for assigning resource to activities:** (Refer Fig 4.8 above)

1) Choose Project, Activities.
2) Select the activity to which you want to assign a resource.
3) Display Activity Details, then click the Resources tab.
4) Click Add Resource.
5) Select the resource you want to assign.
6) If resource security is enabled you can only select resources you have access to.
   Click the Assign button, then click the Close button.
4.2.9 Allocating the number of resource units.

**Fig no 4.9**: Screenshot showing allocation of no. of resource units in Primavera P6.

**Steps to be followed in Primavera P6 for allocating the number of resource units**:

(Refer Fig 4.9 above)

1) Choose on Assignments from the left side panel.

2) On the window that will be displayed, allocate the number of resource units under budgeted units column for the respective activity.
4.2.10 Addition of desired Data columns.

Fig no 4.10: Screenshot showing addition of desired data column in Primavera P6.

Steps to be followed in Primavera P6 for addition of desired data column: (Refer Fig 4.10 above)

1) Right click on the screen so as the dialogue box shown in figure above is displayed.

2) Double click on “Column”.

3) Select the column which you want to be displayed in the result. Click “OK”
4.2.11 Addition of Duration to the respective activities and set baseline

**Fig no 4.11:** Screenshot showing addition of duration to respective activities in Primavera P6.

**Steps to be followed in Primavera P6 for** addition of duration to respective activities (**Refer Fig 4.11**) and setting of baseline (**Fig 4.12 to Fig 4.15**)

1) Click on the ‘Original duration’ column for every activity and add the duration for each of them (Fig 4.11)

**Fig no 4.12:** Screenshot showing how to maintain baseline in Primavera P6.
**Fig no 4.13:** Screenshot showing how to maintain baseline in Primavera P6.

2) Click on ‘Projects’. Click on ‘Maintain Baseline’.

3) Window shown in Fig no 4.13 will be displayed.

4) Click ‘Add’. Select ‘Add new baseline’ and click ‘OK’.

**Fig no 4.14:** Screenshot showing how to assign baseline in Primavera P6.
Fig no 4.15: Screenshot showing how to assign baseline in Primavera P6.

5) Click on ‘Projects’. Click on Assign Baseline’ as shown in Fig no 4.14.

6) Window shown in Fig no 4.15 will be displayed. Now select the maintained baseline. Click ‘OK’.

4.2.13 Scheduling the entire dataset

Fig no 4.16: Screenshot showing the procedure of scheduling the entire dataset in Primavera P6.
Steps to be followed in Primavera P6 for scheduling the entire dataset: (Refer Fig 4.16 above)

1) Press F9 on the keyboard.
2) Screen shown in Fig 4.16 will be displayed.
3) Select the date from which the entire project is to be scheduled.
4) Click ‘OK’.

4.2.14 Tracking the progress of different activities.

Fig no 4.17: Screenshot showing the procedure of tracking the progress of different activities in Primavera P6.

Steps to be followed in Primavera P6 for tracking the progress of different activities: (Refer Fig 4.17 above).

1) Click on ‘Activity Details’.
2) Image shown in Fig 4.17 will be displayed. Select the activity to be tracked.
3) Click on Status. Right click on ‘Started’. Put the desired % of Activity completion. Primavera will show the no of days remaining for completion of that particular activity.
4.2.14 Creation of Different types of Reports

Fig no 4.18: Screenshot showing the procedure of creation of different types of Reports in Primavera P6.

Steps to be followed in Primavera P6 for creation of different types of Reports: (Refer Fig 4.18 above).

1) Choose on Reports from the left side panel.

2) A list of different kinds of reports which Primavera can generate will be displayed.

3) Select the type of report you want to generate from the relevant category of reports.

4) Click on ‘Run’, Click Report to see desired report on the screen.
Chapter 5

RESULTS, DISCUSSION AND CONCLUSION

5.1 General

The step by step creation of a schedule for a project is stated in Chapter 4. Once the schedule is ready, it can be utilised in different ways for reducing the duration of resources, making optimal utilisation of resources and in turn reducing the time overrun and cost overrun.

5.2 Results & Discussions

The results of the schedule prepared in primavera can be displayed in the form of various kinds of reports that are generated at the end. The types of reports are categorized under different categories so as to be useful to different stakeholders involved in a project. On the basis of these reports, the project progress can be monitored and corrective measures if required can be taken so that the project is completed in the said duration.
The categories of reports that can be generated are shown in the Fig 5.1 below.

![Fig 5.1: List of different types of Reports that can be generated in Primavera P6.](image)

### 5.2.1 List of Reports generated in Primavera

A list of some of the salient reports that can be generated followed by the details of their utility are as under:

1. Report showing Activity breakdown by WBS.
2. Report showing Activity relations.
3. Report showing Activity status
4. Report showing Classic WBS relation.
5. Report showing Classic schedule.
6. Report showing Logic of the activities involved in a project.
7. Report showing Predecessors & Successors.
8. Report showing Resources and respective role assignments.
9. Report showing Resource Assignment of all activities.
5.2.1.1 Report showing Activity breakdown by WBS.

Utility of this Report

This report shows the list of activities and their breakdown as per WBS. It further mentions the type of activity and its status as on the date on which the project is generated. The activities which have not started yet can be given more emphasis so that the project is not delayed.
5.2.1.2 Report showing Activity relations

**Fig no 5.3:** Report showing Activity relations

**Utility of this Report**

It gives a pictorial representation of activity interdependency, critical activities and presence of dummy activity if any as shown in fig 5.3. It is highly impossible to prepare a huge network of a complex project manually.
### 5.2.1.3 Report showing Activity status

**AD-01 Activity Status Report**

<table>
<thead>
<tr>
<th>Activity ID</th>
<th>Activity Name</th>
<th>Original Duration</th>
<th>Remaining Duration</th>
<th>Activity % Complete</th>
<th>Primary Resource</th>
<th>Early Start</th>
<th>Early Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4610</td>
<td>Floor Finish</td>
<td>13</td>
<td>13</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>18-Mar-10</td>
<td>06-Jun-10</td>
</tr>
<tr>
<td>A3770</td>
<td>Internal Heater</td>
<td>19</td>
<td>19</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>18-Mar-10</td>
<td>06-Jun-10</td>
</tr>
<tr>
<td>A2290</td>
<td>Internal Pumper</td>
<td>19</td>
<td>19</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>22-Mar-10</td>
<td>01-Apr-17</td>
</tr>
<tr>
<td>A4820</td>
<td>Fixing of Aluminium Windows</td>
<td>3</td>
<td>3</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>08-Jun-10</td>
<td>14-Jun-15</td>
</tr>
<tr>
<td>A4940</td>
<td>Wall and Ceiling</td>
<td>4</td>
<td>4</td>
<td>0%</td>
<td>OA-47 PAINTER</td>
<td>05-Jun-15</td>
<td>15-Jun-15</td>
</tr>
<tr>
<td>A4850</td>
<td>Wooden Door Frame Painting</td>
<td>1</td>
<td>1</td>
<td>0%</td>
<td>OA-47 PAINTER</td>
<td>15-Jun-15</td>
<td>16-Jun-15</td>
</tr>
<tr>
<td>A4640</td>
<td>Water Proofing in Balcony</td>
<td>3</td>
<td>3</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>21-Jun-15</td>
<td>26-Jun-15</td>
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<tr>
<td>A4850</td>
<td>Water Proofing in Toilet</td>
<td>13</td>
<td>13</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>27-Jun-15</td>
<td>02-Jul-15</td>
</tr>
<tr>
<td>A4650</td>
<td>Floor Finishing</td>
<td>10</td>
<td>13</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>12-Jul-10</td>
<td>07-Aug-10</td>
</tr>
<tr>
<td>A4660</td>
<td>Fixing of Aluminium Windows</td>
<td>3</td>
<td>3</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>03-Aug-10</td>
<td>09-Aug-15</td>
</tr>
<tr>
<td>A4870</td>
<td>Wall and Ceiling</td>
<td>4</td>
<td>4</td>
<td>0%</td>
<td>OA-47 PAINTER</td>
<td>05-Aug-10</td>
<td>15-Aug-10</td>
</tr>
<tr>
<td>A4680</td>
<td>Wooden Door Frame Painting</td>
<td>1</td>
<td>1</td>
<td>0%</td>
<td>OA-47 PAINTER</td>
<td>15-Aug-15</td>
<td>15-Aug-15</td>
</tr>
<tr>
<td>A4380</td>
<td>Insulation</td>
<td>2</td>
<td>1</td>
<td>70%</td>
<td>OA-43 MAO SOHO</td>
<td>15-Aug-18</td>
<td>15-Sep-17</td>
</tr>
<tr>
<td>A1120</td>
<td>Concrete</td>
<td>4</td>
<td>2</td>
<td>50%</td>
<td>OA-48 MAZ DOOR</td>
<td>22-Sep-18</td>
<td>25-Oct-17</td>
</tr>
<tr>
<td>A2140</td>
<td>Internal Heater</td>
<td>10</td>
<td>3</td>
<td>0%</td>
<td>OA-43 MAO SOHO</td>
<td>02-Nov-18</td>
<td>06-Dec-17</td>
</tr>
<tr>
<td>A1420</td>
<td>Concrete</td>
<td>4</td>
<td>2</td>
<td>60%</td>
<td>OA-43 MAO SOHO</td>
<td>17-Dec-18</td>
<td>15-Jan-17</td>
</tr>
</tbody>
</table>

**Total**          | 609                        | 583               | 24-Jan-16          | 16-Aug-18         |

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**Fig no 5.4:** Report showing Activity status

**Utility of this Report**

This report indicates the name of activities, their sequence, Original duration, Remaining duration, EST, EFT, primary resources required and most importantly the Activity % completion at one single glance.
5.2.1.4 Report showing Classic WBS Relation.

**Fig no 5.5:** Report showing classic WBS relation.

**Utility of this Report**

This report shows the relationships between different activities related to different systems of a WBS. It indicates the critical activities clearly so that more concentration can be provided to these activities.
5.2.1.5 Report showing Classic Schedule

Utility of this Report

This report is of great use to all the stakeholders involved in a project as it shows the EST, EFT, LST, LFT and total float associated with each and every activity involved in a project.
5.2.1.6 Report showing Logic of the activities involved in a project

![Logic Report, By Project](image)

Fig no 5.7: Report showing logic of the activities involved in a project

Utility of this Report

This report is of great use to all the stakeholders involved in a project as it shows the EST, EFT, LST, LFT, total float and predecessors associated with each and every activity involved in a project.
5.2.1.7 Report showing Predecessors and Successors of Activities

Fig no 5.8: Report showing predecessors and successors of an activity

Utility of this Report

This report is of great use to all the stakeholders involved in a project as it shows the EST,EFT,LST,LFT,total float and predecessors and successors as well associated with each and every activity involved in a project.
5.2.1.8 Report showing Resources & Respective Role Assignments

Fig no 5.9: Report showing resources & respective role assignments

Utility of this Report

This report shows the resources associated with different activities, budgeted units, % completion, actual units and remaining units.
5.2.1.9 Report showing Resource Assignment of all activities

**Fig no 5.10**: Report showing resource assignment of all activities

**Utility of this Report**

This report shows the resource requirement of various categories of resources related to any particular activity. This can be of great use for resource levelling and smoothing if it is required to be done.
5.2.1.10 Report showing Schedule with Resource Usage

![SR-22 Schedule Report with Resource Usage](image)

**Fig no 5.11**: Report showing schedule with resource usage

**Utility of this Report**

This report shows the resource requirement of various activities alongwith maximum units required, budgeted units, Actual units and remaining units. This can be used for optimum utilisation of resources.
5.2 Conclusion

We found that Primavera P6 is a very effective tool because of the following points that we could experience, practice and improve while preparing the schedule for a multistoried building using PV6:

- Creation of a schedule for a major and complex construction project involving number of activities and interdependencies is a tedious job if done manually. On the other hand, PV6 can handle it with great ease.
- Developing the sequence and logic between different activities becomes very easy when an appropriate database is created in PV6.
- Various calculations related to Activity times, duration, identification of critical path, resource assignment and allocation, tracking of the project progress can be done with great ease using PV6.
- Reports of various kinds and having varying utility to all stakeholders involved in a project can be easily generated using a single database. These reports can prove to be a guideline for taking corrective actions required if any for completing the project in desired time.
- Updation and modification in activity sequence or logic, change in scope of the project and subsequent change in the planning & scheduling can be easily incorporated in PV6.
- **The site under consideration was actually completed in 2.5 years without using any project management tool.** The same project when scheduled through Primavera required total project duration of 583 days (Almost 1.5 years). Such a reduction in the project duration will help in achieving overall economy for the project.
- This project work helped us to get an idea about the taskwork that can be completed in a unit time for different activities.
5.3 Summary

Application of primavera will benefit project managers, site engineers and clients in the following manner:

Project manager

- It will give up-to-date information about the progress of work.
- It will help in controlling big project sites.
- It will enable him to know about the cost incurred/spent and the quantity of materials consumed.
- It will reduce time for decision making as all information is in one system.

Site engineer

- It can be used for controlling the project site by knowing the progress of work.
- It will help in easy decision making for procurement of funds or resources.
- This will help him in informing the contractors beforehand about the start of their work.
- It will help in knowing how much material is required at a particular point of time which will further help in reducing wastage of materials.

Client

- He will be able to know the exact status of the project at any point of time.
- The entire decision making process can be enhanced and kept live because of availability of information at a single glance.

5.4 Future Scope

This piece of work can be further enhanced by incorporating following attributes:

- Resource levelling & smoothing.
- Project updation.
- Cost Aspect of the project and benefit cost analysis.
References


