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Planning and Scheduling of Nagpur Metro Project using Smart-sheet tool

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Abstract: ***Smart-Sheet is a project management software product, developed and sold by Smart consultancies. It is designed to assist a project manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analysing workloads. Smart sheet can be used as a standalone tool for tracking project progress or it can be used for tracking complex project distributed in many geographical areas and managed by a number of project managers. Smart Sheet is designed to assist a project manager in:***

1) Developing a plan,
2) Assigning resources to tasks,
3) Tracking progress,
4) Managing budget and
5) Analysing workloads.

In this study an effort is made to estimate the changes in overall cost and time required to execute the phase 1 work of Nagpur metro rail project when done by conventional execution approach and when done by project management software tool of smart sheet

Keywords*: *Project management, Smart sheet, Conventional construction execution, Cost optimization, Time optimization, Resource optimization.

I. INTRODUCTION

Project management involves the application of various knowledge areas, tools and skills along with numerous techniques to congregate project requirements like duration and cost.

The factors that affect project management are:

1) *Project Cost:* Projects must be within the planned budget.
2) *Project Time:* Project must be delivered on specified time.
3) *Project Scope:* Project must be within précised scope
4) *Project Requirement:* Project should meet client's requirement without affecting the quality, budget, précised scope and should be completed and delivered on specified time.

Smart Sheet is designed to assist a project manager in:

a) Developing a plan,
b) Assigning resources to tasks,
c) Tracking progress,
d) Managing budget and
e) Analysing workloads.

The objectives of these project studies are:

a) To know about the basics of project management.
b) To know about the equipment scheduling, management.
c) To study the scheduling technique using network models (CPM).
d) To ease of work for the Labour.
e) To reduce the cost by proper allocation of resources

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II. METHODOLOGY

Smart sheet is a Project Management software, developed and sold by Smart sheet Inc. It is designed to assist the project manager to develop the plan, schedule the activities, assign resources to the activities, track the progress, manage the budget and analyse the work load. Smart sheet can identify different classes of users. These different classes of users have diverse access levels to various project views, levels of project and other data. Software is applicable to track single project with numerous activities and resources. It comprises of an option to visually choose the resources as per the requirement. Calendars, tables, filters, views and other customization aspects in Smart sheet are stored as an enterprise inclusive (global), which can be accessible to all users. Smart sheet utilizes the team collaboration and accesses the results. A detailed study was carried out with respect to construction of a multi-storeyed residential apartment regarding cost, time, labour and material management.

The objective of the study was to compare the Conventional approach (Plan A) and Project Management approach by Smart sheet (Plan B) of execution taking into account the cost and duration criteria to understand and improve the construction execution practices. A multi-storeyed residential building, which has been executed using conventional methods, has been considered in the present study. The study focuses on the cost, duration and resource management that have been employed for the execution of the project. The extract of data obtained from the building site is titled as Plan A- Conventional execution approach.

An analysis of planning and scheduling was again carried out for the same multi-storeyed building by applying project management skills and techniques with help of Smart sheet software. This was carried out to obtain comparison with plan A- Conventional execution approach. The resulting analysis was titled as Plan B- Project Management approach by Smart sheet. The case study details are as follows:

1) *Name of the Project:* "Nagpur metro rail project phase 1 work"
2) *Location:* "North south corridor of metro rail"
3) *Type of the Project:* Metro rail infrastructure
4) *No of Stations:* 17
5) *Start of the Project:* February 2013
6) *Completion of Project:* December 2021
7) *Type of Construction:* Elevated rail corridor, station buildings, coach depot.

A. Plan A- Conventional Approach for Execution

The data obtained from the construction site was analysed and incorporated into MS Project application to obtain a detailed result of the cost and duration planned for construction of the building. As a result, a duration of 102 months and cost of R s. 3015 crores has been estimated for executing activities by conventional approach.

B. Plan B- Project Management Approach

The data obtained from the construction site along with Plan-A: Conventional execution approach, was analysed and a plan was prepared again in Smart sheet with the application of project management skills and techniques, to get the clear picture of the duration and cost for the construction of the building. This approach was being carried out to present an idea about, accurate planning and scheduling of project by prevailing over the problems that occurred during actual conventional construction execution practices like:

1) Construction activities were not planned and scheduled accurately which resulted in extension of project date and increase in cost.
2) The activities were not executed as per the prepared plan due to various unplanned sources and non-consideration of uncertainties, which resulted in delay.
3) Over-allocation of various resources due to improper resource management, which resulted in delay for completion of project.
4) Labour fatigue owing to over time of the work causing labour inefficiency.
5) Improper identification of parallel activities which would have been started simultaneously.

Slack time and non-critical activities were not recognized, which could be crushed to reduce the extension of project.

Thus, Resource optimization, identifying resource wastages (i.e. non-value adding activities) and fast tracking the scheduled activities to optimize duration, were the main factors taken into consideration in the project management approach. As a result, a duration of 96 months and cost of R s. 2777 crores has been estimated for executing activities by project management approach.

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III.CONCLUSIONS

The results of analysis for Plan A and Plan B are represented in Table below:

Plans	Methods	Cost	Duration
A	Conventional execution approach	3015 crores	102 months
B	Project management approach by Smart sheet	2777 crores	96 months

Table 1 Conclusions of Studies

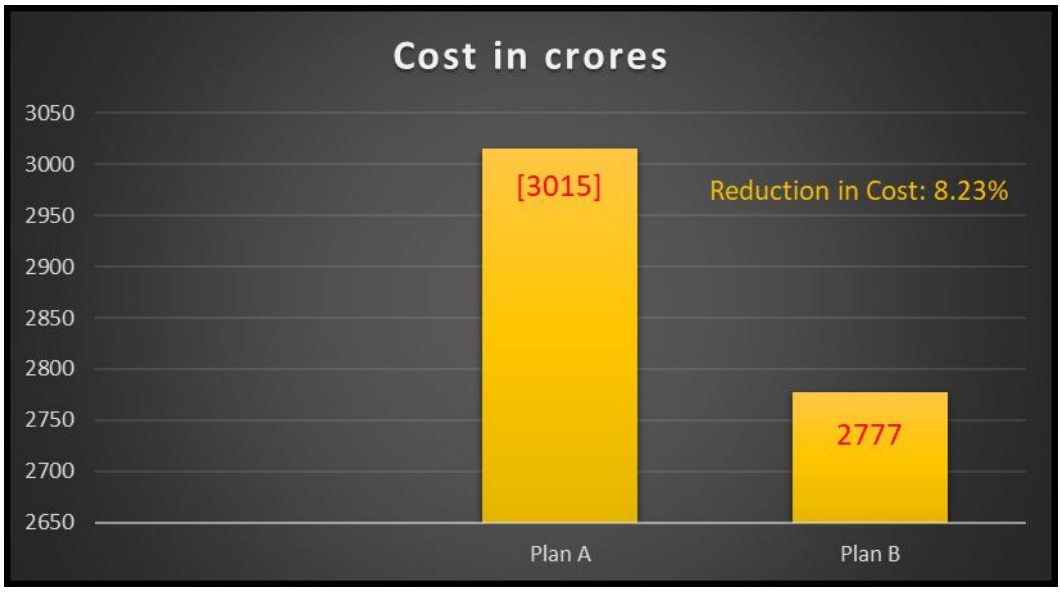


Fig 1. Cost reduction

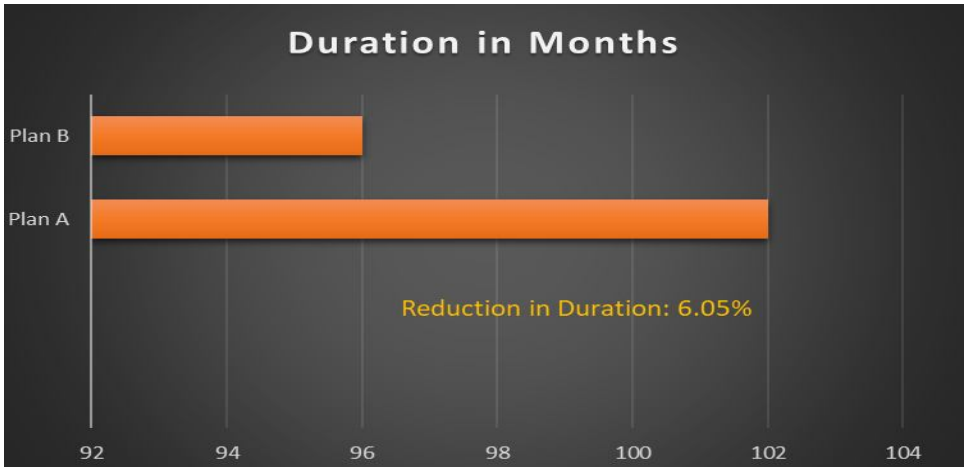


Fig 2. Duration reduction

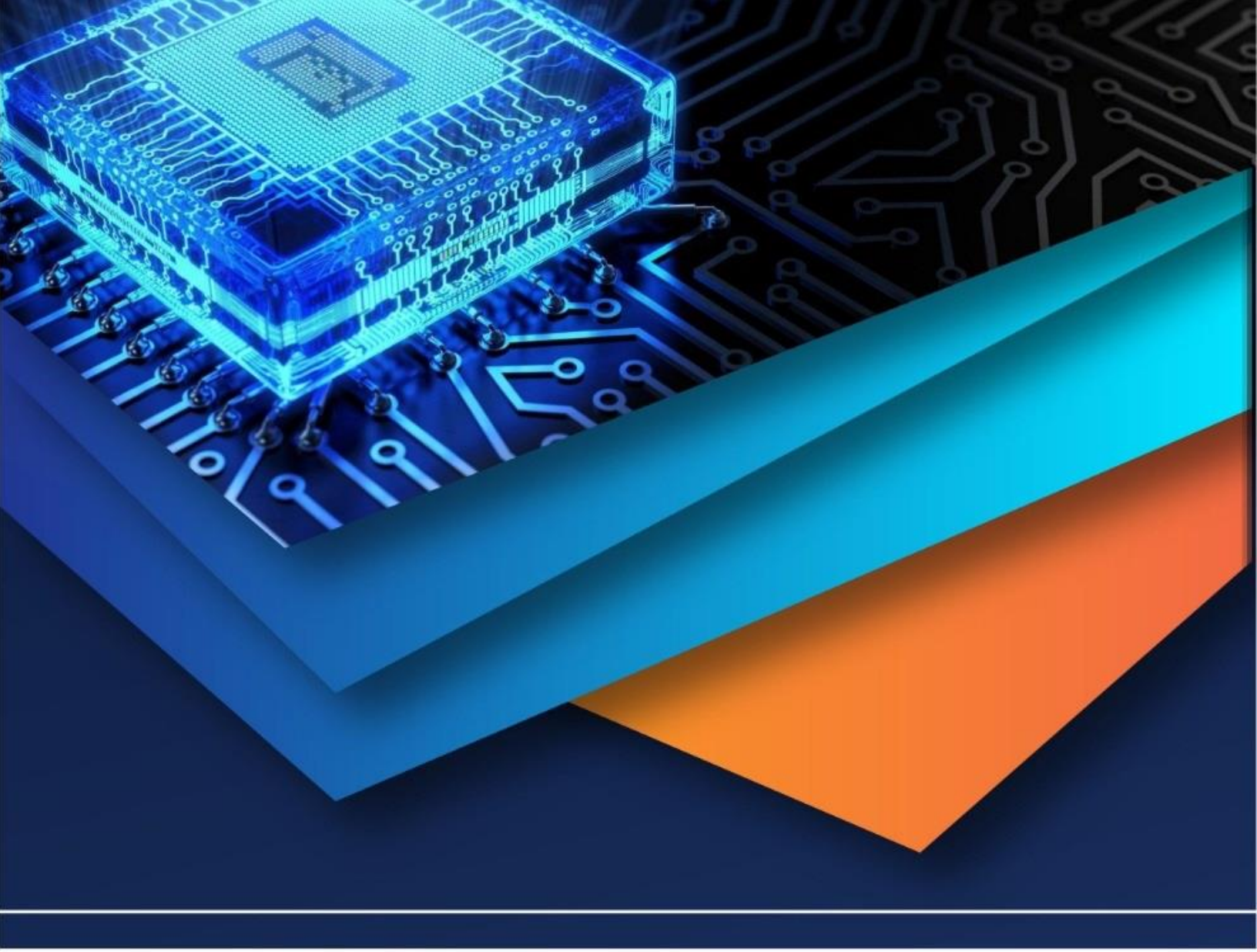
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The graph shows a considerable amount in reduction of cost and time by the application of management in project execution. The duration has reduced by 6.05% and cost by 8.23% between the two plans. Most of the activities were carried out either continuously or sequentially. The rescheduling of activities with proper sequencing its occurrence, along with accurate planning, optimization, and proper allocation of resources as well as fast tracking the scheduled activities has enabled to reduce the duration to a considerable extent. The reduction in cost is not significant as the use of men, materials and machinery is similar.

REFERENCES

[1] IS 15883-1 (2009): Construction project management -Guidelines, Part 1: General.
[2] IS 15883-2 (2013): Construction project management -Guidelines, Part 2: Time Management.
[3] IS 14580-2 (2006): Use of network analysis for projects management, Part 2: Use of graphic technique.
[4] K.K. Chitkara, “Construction Project Management” Tata McGraw Hill, Tenth Edition, 1998.
[5] PMBOK, A Guide to the project management body of knowledge, 2000.
[6] B.C. Punmia “Project management and planning”.

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