https://doi.org/10.46335/IJIES.2021.6.5.1 **e-ISSN: 2456-3463**
Vol. 6, No. 5, 2021, PP. 01 - 04

International Journal of Innovations in Engineering and Science, www.ijies.net

Construction Management of a High Rise Structure Using MSP Software

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***Received on**: 03 May, 2021, **Revised on**: 30 May, 2021, **Published on**: 31 May, 2021*

***Abstract** –High-rise residential building is a type of housing that has multi-dwelling units built on the same land. The exploding population, largely urban, creates an increasing demand for tall buildings. The ever increasing population and growing economies in major cities of the world mean increasing urbanization globally and the continuing rise in population density in urban areas. The tall building can accommodate many more people on a smaller land than would be the case with low-rise building on the same land. In our project we have mainly worked on the construction management of high rise structure. The scheduling of various activities has been done in Microsoft Project Management Software by adding various activities, duration, resources required and cost of each activities. The various difficulties faced during the entire project was also identified and solved.*

Keywords-Scheduling, multi dwelling, construction management, project management software

I- INTRODUCTION

The future of India is what Indians are building today, and the Indian goals along with other means and resources will allow the nation to determine the future of the country. India has suffered greatly in recent decades as a result of occupation, closure and lack of resources. That and other issues have caused stagnation in many aspects of civilization and progress for the Indian society in future. Despite this, commercial and residential construction work in India is increasing rapidly to meet the growing needs of the population and to keep up with global development. For India to progress in terms of construction project construction must be studied carefully and prepared well in order to get the best results, and to help in moving in the right direction to establish the future goals. The requirements of growing population in Mumbai are growing at rapid rate with the rate of population. People are searching for more space for their enhancing lifestyles. It is self explanatory that accommodation is one of the basic requirements for any industry or a person personally. In this case to achieve the demands of people the high rise buildings are the major solution both aesthetically, and technically. The lack of risk assessment from the perspective of project management is one of the key contributors to the problem. To take an example, Palais royal located in Lower Parel, Mumbai is on hold due to lack of risk assessment and management before starting the construction. High rise buildings are one of the top most sophisticated structures in demand today. Normally each and every construction companies today are working on it. India lack the technologies for high rise project because of short construction history and insufficient

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data and research. With the introduction of RERA Act in 2016 it has brought much needed efficiency and transparency in the construction industry via uniform regulation. With RERA Act implemented across the country, Developers are likely to focus on the Timely delivery of their ongoing projects and also remain increasingly flexible on payments. Thus with the introduction of RERA Act Construction Management has became much more vital and inevitable in the country.

II- METHODOLOGY

- Determination of objective
- Determination of scope of study
- Study of Literature review
- Conducting Site Visits
- Understanding of Microsoft project software
- Preparation of cost estimates, budget
- Resource management
- Implementation of software
- Conclusion

III- MSP SOFTWARE

- Microsoft project is a project management software product, developed and sold by Microsoft. it is designed to assist a project manager in developing a schedule, assigning resources to tasks, tracking progress, managing the budget, and analyzing workloads.
- The scheduling of the entire project has been done in MSP software
- All the activities, duration, resources, cost have been added in the software.

The following is the Work breakdown structure adopted:

- Site clearance
- Centre-line marking
- Construction of Footings
- Backfilling
- Plinth Beam
- Column marking and starters
- Column R/F tying
- Column Casting
- Formwork for beam and slab
- Laying reinforcement for slab and beams
- Electric layout installation
- Slab and beam casting
- Brickwork
- Internal waterproofing
- Internal plastering
- External plastering
- Internal plumbing work
- Flooring work
- Internal electric work
- Internal and external painting
- External plumbing work
- Facade work

The image below indicate the activities along with Gantt chart:

Task Mode	Task Name	Duration	Start	Finish	Baseline Start	Baseline Finish
	ARIANA RESIDENCY	830 days	Mon 29/06/20	Tue 13/09/22	Mon 07/10/19	NA
✓	Excavation	71.75 days	Mon 29/06/20	Thu 03/09/20	Mon 29/06/20	Thu 03/09/20
✓	G.F Slab	17.25 days	Fri 04/09/20	Sat 19/09/20	Fri 04/09/20	Sat 19/09/20
✓	1st Slab	17.25 days	Mon 21/09/20	Tue 06/10/20	Mon 21/09/20	Tue 06/10/20
✓	2nd Slab	17 days	Wed 07/10/20	Thu 22/10/20	Wed 07/10/20	Thu 22/10/20
✓	3rd Slab	17.25 days	Fri 23/10/20	Sat 07/11/20	Fri 23/10/20	Sat 07/11/20
✓	4th Slab	17.25 days	Mon 09/11/20	Tue 24/11/20	Mon 09/11/20	Tue 24/11/20
✓	5th slab	18.5 days	Wed 25/11/20	Fri 11/12/20	Wed 25/11/20	Fri 11/12/20
✓	6th slab	24.75 days	Fri 11/12/20	Sat 02/01/21	Fri 11/12/20	Mon 28/12/20
✓	7th Slab	22.25 days	Mon 04/01/21	Sat 23/01/21	Tue 29/12/20	Thu 14/01/21
✓	8th Slab	19.75 days	Mon 25/01/21	Thu 11/02/21	Mon 11/01/21	Thu 28/01/21
✓	9th Slab	17.25 days	Fri 26/02/21	Mon 15/03/21	Fri 29/01/21	Sat 13/02/21
✓	10th Slab	17.25 days	Tue 16/03/21	Thu 01/04/21	Mon 15/02/21	Tue 02/03/21
✓	11th Slab	17.25 days	Sat 03/04/21	Wed 21/04/21	Wed 03/03/21	Fri 19/03/21
✓	12th Slab	17.25 days	Thu 22/04/21	Sat 08/05/21	Sat 20/03/21	Wed 07/04/21
	13th Slab	17.25 days	Mon 10/05/21	Thu 27/05/21	Thu 08/04/21	Mon 26/04/21
	14th Slab	17.25 days	Fri 28/05/21	Sat 12/06/21	Tue 27/04/21	Fri 14/05/21
	15th Slab	17.25 days	Mon 14/06/21	Tue 29/06/21	Mon 17/05/21	Wed 02/06/21
	16th Slab	17.25 days	Wed 30/06/21	Thu 15/07/21	Thu 03/06/21	Fri 18/06/21
	17th Slab	17.25 days	Fri 16/07/21	Mon 02/08/21	Sat 19/06/21	Mon 05/07/21
	18th Slab	17.25 days	Tue 03/08/21	Fri 20/08/21	Tue 06/07/21	Thu 22/07/21

Fig 1- Activities

✓		7th Slab	22.25 days	Mon 04/01/21	Sat 23/01/21	Tue 29/12/20	Thu 14/01/21
✓		8th Slab	19.75 days	Mon 25/01/21	Thu 11/02/21	Mon 11/01/21	Thu 28/01/21
✓		9th Slab	17.25 days	Fri 26/02/21	Mon 15/03/21	Fri 29/01/21	Sat 13/02/21
✓		10th Slab	17.25 days	Tue 16/03/21	Thu 01/04/21	Mon 15/02/21	Tue 02/03/21
✓		11th Slab	17.25 days	Sat 03/04/21	Wed 21/04/21	Wed 03/03/21	Fri 19/03/21
✓		12th Slab	17.25 days	Thu 22/04/21	Sat 08/05/21	Sat 20/03/21	Wed 07/04/21
		13th Slab	17.25 days	Mon 10/05/21	Thu 27/05/21	Thu 08/04/21	Mon 26/04/21
		14th Slab	17.25 days	Fri 28/05/21	Sat 12/06/21	Tue 27/04/21	Fri 14/05/21
		15th Slab	17.25 days	Mon 14/06/21	Tue 29/06/21	Mon 17/05/21	Wed 02/06/21
		16th Slab	17.25 days	Wed 30/06/21	Thu 15/07/21	Thu 03/06/21	Fri 18/06/21
		17th Slab	17.25 days	Fri 16/07/21	Mon 02/08/21	Sat 19/06/21	Mon 05/07/21
		18th Slab	17.25 days	Tue 03/08/21	Fri 20/08/21	Tue 06/07/21	Thu 22/07/21
		19th Slab	17.25 days	Sat 21/08/21	Mon 06/09/21	Fri 23/07/21	Sat 07/08/21
		20th slab	17.25 days	Tue 07/09/21	Thu 23/09/21	Mon 09/08/21	Thu 26/08/21
		21st Slab	17.25 days	Fri 24/09/21	Mon 11/10/21	Fri 27/08/21	Mon 13/09/21
		22nd slab	17.25 days	Tue 12/10/21	Fri 29/10/21	Tue 14/09/21	Wed 29/09/21
		23rd slab	17.25 days	Sat 30/10/21	Tue 16/11/21	Thu 30/09/21	Fri 15/10/21
		Internal Finishing	517.5 days	Thu 22/04/21	Tue 13/09/22	NA	NA

Fig 2- Activities

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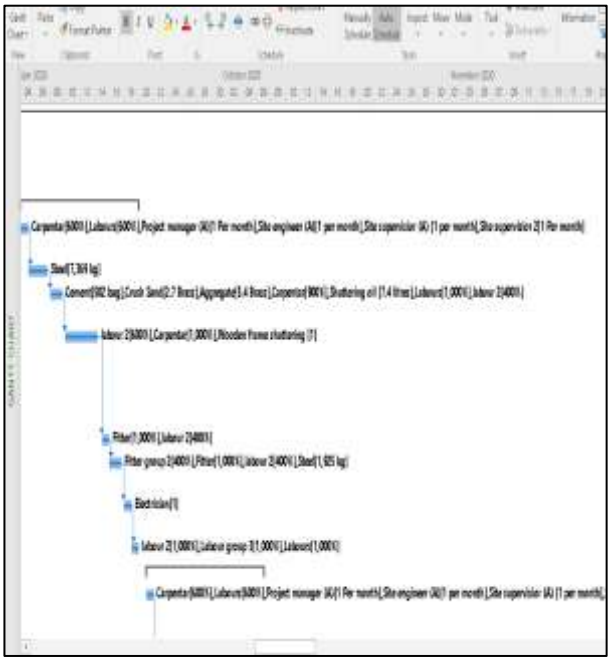


Fig 3- Gantt chart

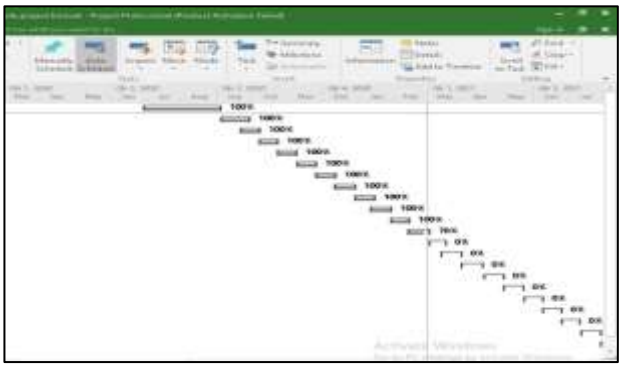
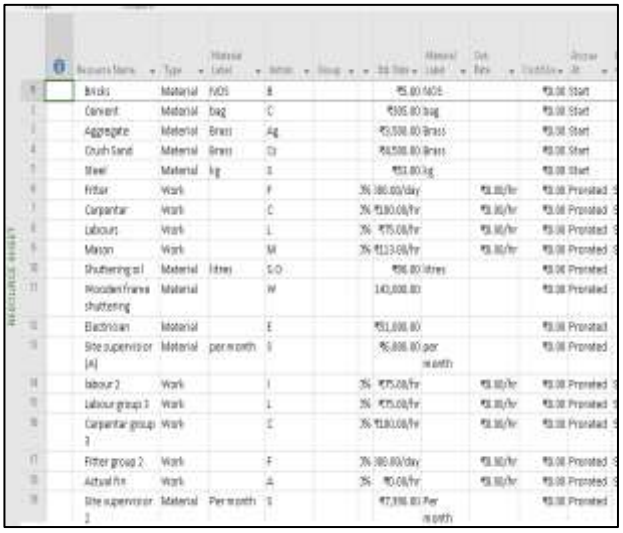


Fig 4- Tracking Gantt



	Resource Name	Type	Material Label	Initials	Group	Std. Rate	Ovt. Rate	Cost/Use	Accrue At
1	Bricks	Material	NOS	B		₹5.00 NOS		₹0.00	Start
2	Cement	Material	bag	C		₹505.00 bag		₹0.00	Start
3	Aggregate	Material	Brass	Ag		₹6,500.00 Brass		₹0.00	Start
4	Crush Sand	Material	Brass	Cr		₹6,500.00 Brass		₹0.00	Start
5	Steel	Material	kg	S		₹53.00 kg		₹0.00	Start
6	Fitter	Work		F		3% ₹80.00/day	₹0.00/hr	₹0.00	Prorated
7	Carpantar	Work		C		3% ₹180.00/hr	₹0.00/hr	₹0.00	Prorated
8	Labourr	Work		L		3% ₹75.00/hr	₹0.00/hr	₹0.00	Prorated
9	Mason	Work		M		3% ₹113.00/hr	₹0.00/hr	₹0.00	Prorated
10	Shuttering oil	Material	litres	S.O		₹90.00 litres		₹0.00	Prorated
11	Wooden frame shuttering	Material		W		140,000.00		₹0.00	Prorated
12	Electrician	Material		E		₹51,000.00		₹0.00	Prorated
13	Site supervisor (A)	Material	per month	S		₹6,000.00 per month		₹0.00	Prorated
14	labour 2	Work		I		3% ₹75.00/hr	₹0.00/hr	₹0.00	Prorated
15	Labour group 3	Work		L		3% ₹75.00/hr	₹0.00/hr	₹0.00	Prorated
16	Carpantar group 3	Work		C		3% ₹180.00/hr	₹0.00/hr	₹0.00	Prorated
17	Fitter group 2	Work		F		3% ₹80.00/day	₹0.00/hr	₹0.00	Prorated
18	Actual Fit	Work		A		3% ₹0.00/hr	₹0.00/hr	₹0.00	Prorated
19	Site supervisor 2	Material	Per month	S		₹7,000.00 Per month		₹0.00	Prorated

Fig 5- Resources

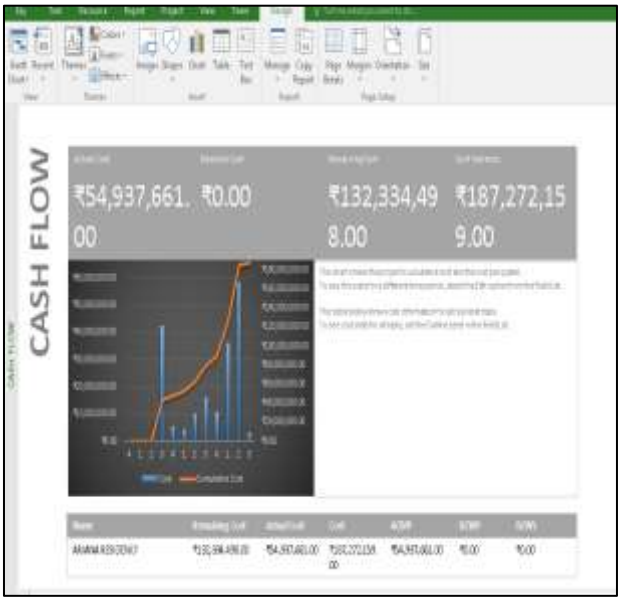


Fig 6- Cost overview

IV- DIFFICULTIES ARISE DURING THE COURSE OF THE PROJECT

- Climatic conditions
- Covid-19 restrictions
- Delay in legal documents
- Conflict between labour and contractor
- Shortage in construction materials
- Differentiating materials according to their units in resource sheet.

V-RESULT

The challenges faced during the project and the effect of those challenges on the activities and thereon on the project are studies. After the various activities were added in the software the GANTT CHART was obtained. The interdependencies amongst various activities are shown in the Gantt chart . Also the total approximate cost incurred for the project is also shown in software.

VI- CONCLUSION

- Accurate and efficient planning and scheduling was done on MSP software made easy working and better results with quick improvisation of corrections and solving problems.
- On the basis of assumptions of the future challenges or difficulties, corrective action were shown in the software like lagging of activities.

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- When the activities were added in the software, we could understand the different areas of MSP software to gain in depth knowledge of software.
- In the course of the project we were able to gain knowledge of ongoing activities by visiting on site of Ariana residency (Borivali) and the procedure of construction activities were obtained and studied with respect to time, material and cost ac further those activities were put in MSP software along with duration and cost.
- Overall, the entire project work was very informative and we gathered much more information about the ongoing project and understood various factors which play vital role in such type of projects.

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