A STUDY OF IMPLEMENTING SIX SIGMA AND MICROSOFT PROJECT IN CONSTRUCTION PROJECT

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Abstract — Effective construction project management benefits owners by increasing the potential for successful project completion on time, within budget, and free of financial or legal complications. Construction management is a professional service that uses specialized project management techniques to oversee the planning, design and construction of a project. Project Management is the Application of knowledge, skills and Techniques to project activities to meet project requirements. Six Sigma is a managerial concept for manufacturing and business. It aims to reduce production defects (errors) and minimize variability over the long term, resulting in as near-perfect products as possible. Practitioners use statistical models to achieve as close as possible to defect-free goals. In this paper work of a residential building has been studied and sigma level has been evaluated. DMAIC methodology has been implemented based on Six Sigma principles which give a systematic framework to identify the impact of duration and cost of the project by Microsoft project.

Keyword: Six Sigma, Microsoft project, construction, DMAIC, Cost, Duration.

1. Introduction

Construction industry is an important industry globally. Effective management of construction projects leading them to their execution is a critical expertise area to ensure the success of the construction industry. This chapter provides a comprehensive understanding of the construction project management from a construction company's perspective. It starts with an overview of the construction industry including an introduction to various types of construction projects. It, then, provides an overview of construction project management and defines various supporting aspects such as, project, project management, attributes of a successful construction project, project life cycle, project participants, construction project organizations, pre-job planning, project start up and mobilization, pre-construction meeting, project documentation, and project closeout.

Project Management is the Application of knowledge, skills and Techniques to project activities to meet project requirements. It is a strategic ability to do something successfully for organizations, enabling them to patch the

project results to Organizational goals and thus, better compete in their markets. It can be also defined as the process and activity of planning, organizing, inspiring, and controlling resources, procedures and protocols to achieve specific goals in scientific or daily problems. A project is a temporary aim designed to produce a special product, service or result with a defined starting and end (usually time-constrained, and often constrained by funding or deliverables), undertaken to meet eccentric goals and objectives, typically to bring about beneficial change or added value. The temporary nature of projects stands in contrast with business as usual (or operations), which are recurring, permanent, or semi-permanent functional activities to produce products or services. In implementation, the management of these two systems is often quite distinct, and as

such requires the development of divergent technical skills and management strategies. It has always been practiced casually, but began to evolve as a prime profession in the mid-20th century.

2. Problem Statement

The extension of time (EOT) given to the contractor does not cause inconvenience or error to contractor, if party is facing the problem, therefore they should be responsible and bare the extra cost due the procrastinations of the problems. As a consequence, the time will stretch, cost will increase and henceforth the quality of the project will degrade the project scheduling is very important in project's life, unfortunately not many civil engineer experts exercises implementation and applications of Microsoft Project in construction project. On other hand side, currently the contractors who used traditional method (Bar Chart in Microsoft Excel) still lead

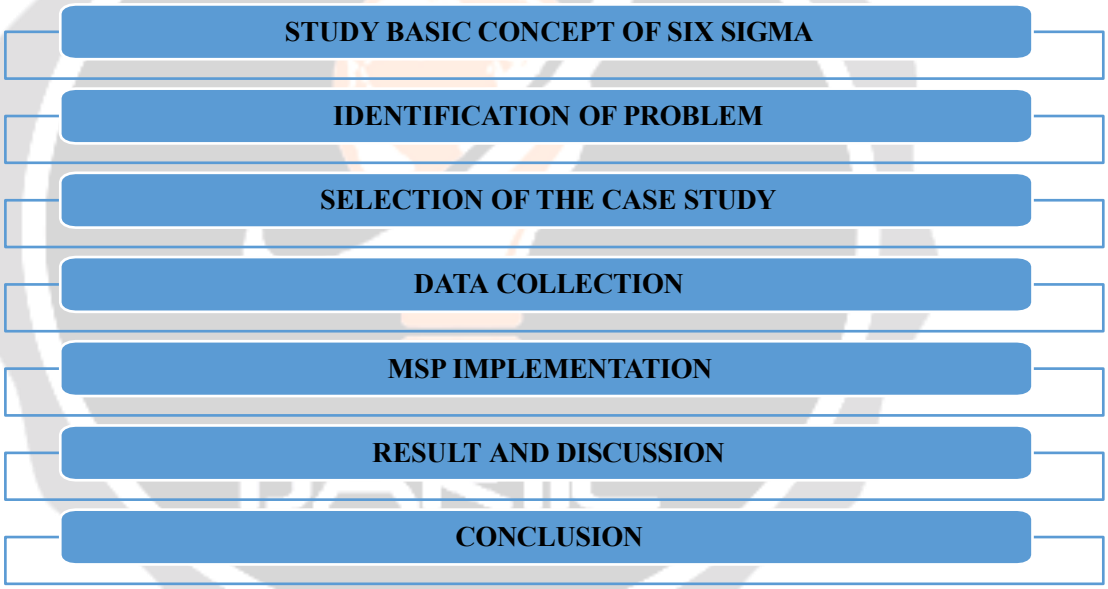
the highest rank compared to the modern software. Although the modern and efficient software ease most of contractor burden in producing accurate and effective planning and scheduling, most small contractors still could not use it due to expensive and high

2.1. Cool Homes Ravet

A G+4 building of 24 flats and of 4 shops is taken for case study location is in Ravet, PUNE under PCMC for plot size 6800 sq. feet

- Case study of a G+4 proposed building of 24 flats and of 4 shops in Ravet, PUNE
- Name of site : Cool homes
- Cost of project: 2.4 cr.
- Total Duration of completion – 1.5 years
- Area : 6400 sq. feet
- Residential building having 24 flats and 4 commercial road front shops.
- This Project is based on sustainable structure
- Present condition of the project: now working on finishing level
- Total 24 flats and 4 shops

3. METHODOLOGY AND DATA ANALYSIS



3.1 A Prepare Estimation And Quantity

Material Summary For Proposed Residential Building, At Cool Homes						
S.R. NO.	**DESCRIPT ION**	**QTY. (IN CUM)**	**CEME NT (IN BAG)**	**Cement in kg**	**Wat er/Cement (w/c)**	**Water in liter**
I.	PCC (M10)	20	89	4429	0.5	2215
	1:03:06					
II.	Footing (M20)	122	996	49781	0.5	24891
	1:01:05					
III.	Plinth Beam	18	150	7488	0.5	3744
IV.	Columns					
1	Footing To Plinth Column	10	83	4163	0.5	2081
2	Plinth To First Column	17	192	9581	0.5	4790
3	First To Second Column	11	91	4550	0.5	2275
4	Second To Third Column	13	109	5450	0.5	2725
5	Third To Fourth Column	13	104	5200	0.5	2600
6	Fourth To Terrace Column	12	98	4900	0.5	2450
7	Terrace To O.H.W.T	10	83	4150	0.5	2075
V.	Beam					
1	First Floor	18	150	7488	0.5	3744
2	Second Floor	16	131	6550	0.5	3275
3	Third Floor	14	114	5700	0.5	2850
4	Fourth Floor	12	98	4900	0.5	2450
5	Terrace Floor	10	82	4100	0.5	2050
VI.	Slab					
1	First Floor	51	420	21000	0.5	10500
2	Second Floor	48.45	396	19800	0.5	9900
3	Third Floor	46.02	376	18800	0.5	9400
4	Fourth Floor	43.72	357	17850	0.5	8925
	Total Water In Litre	111415				

3.1 B Scheduling In MSP to Know Total Duration of Project

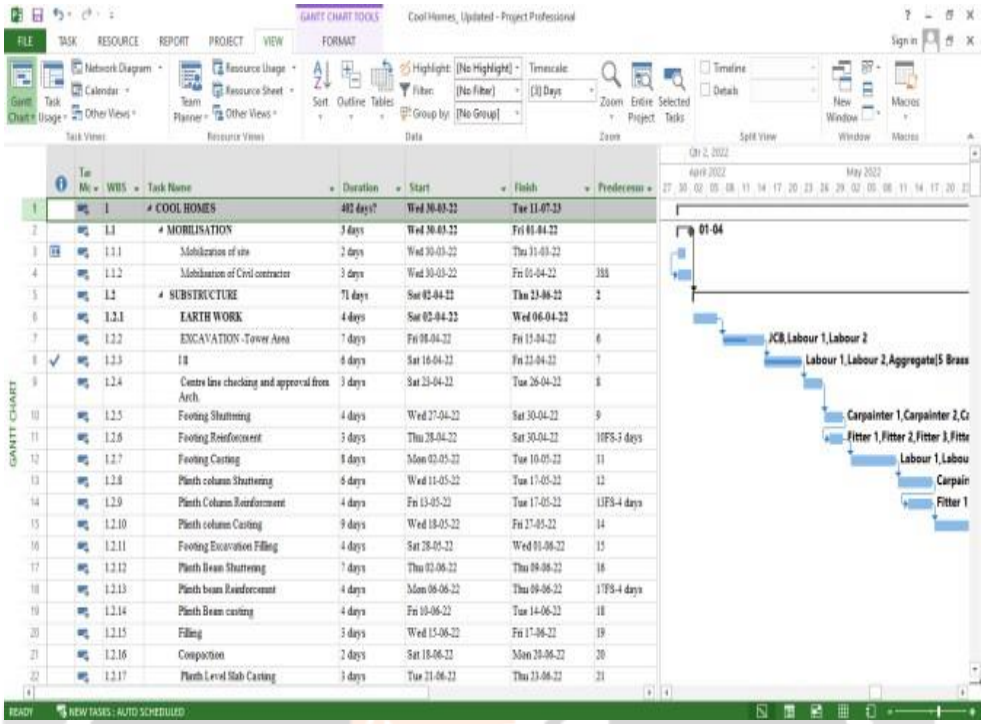


Fig 1 Final Duration required for Project (402 Days)

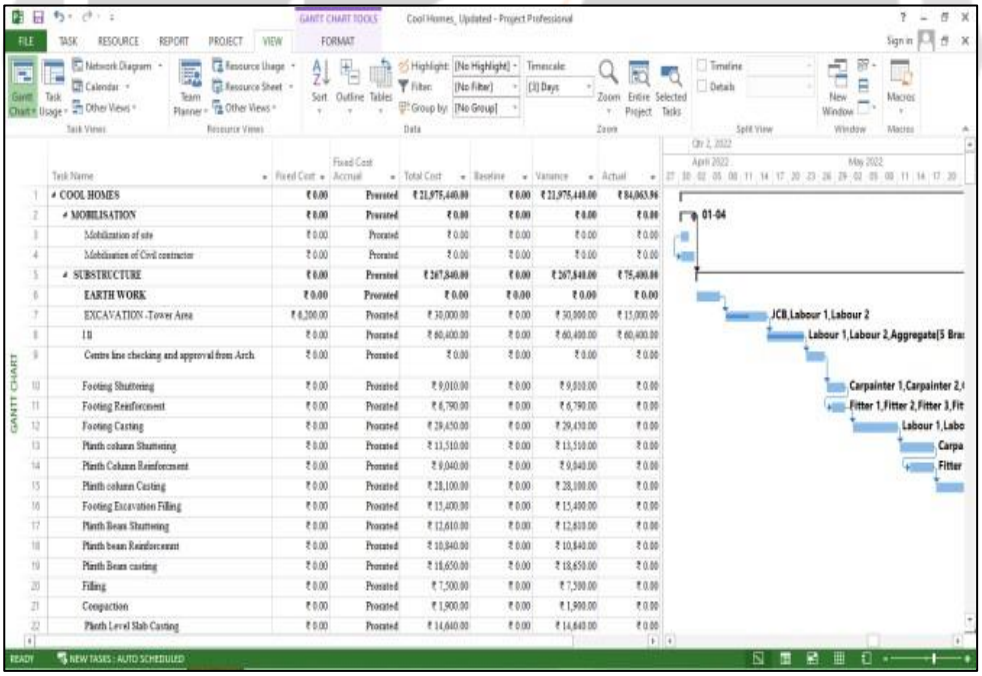
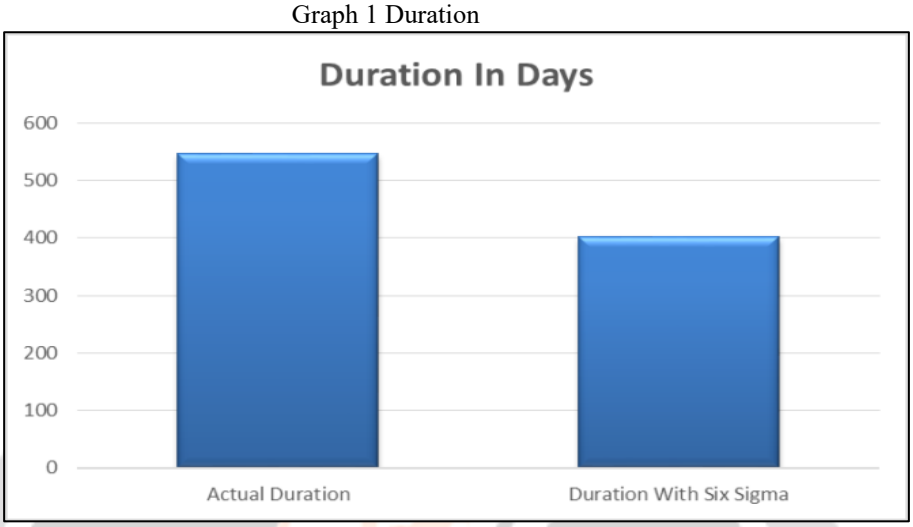


Fig 2 Final Cost for Project (2.19 Cr)

Table 1 Duration

	Actual Duration	Duration With Six Sigma
Duration In Days	547	402

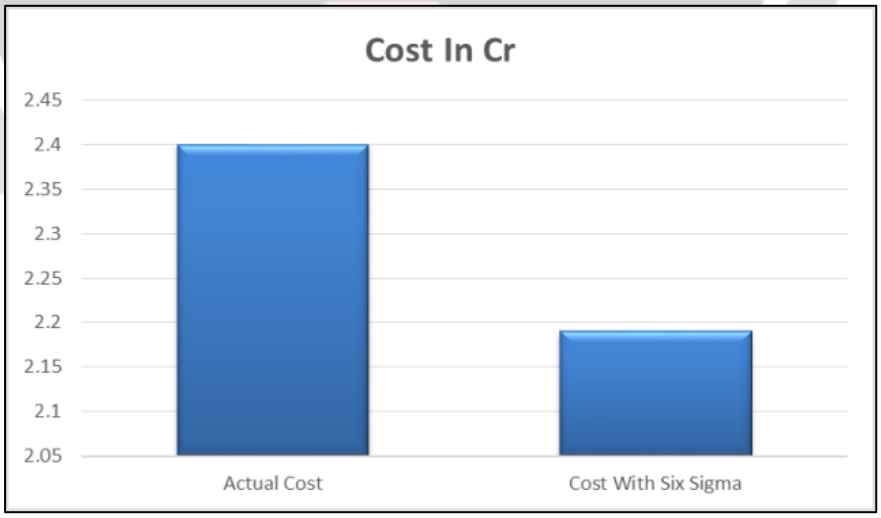
Graph 1 Duration



Above graph shows the after applying the 6 Sigma to the project we can reduce duration of the project by 140days i.e. [almost 4-5 months.]

Table 2 cost

	Actual Cost	Cost With Six Sigma
Cost In Cr	2.4	2.19



Above graph shows the after applying the 6 Sigma to the project we can reduce cost of the project by almost 21L, and also reduce cost ie labor cost of the project for 140 days

4. Conclusion

- Six Sigma can be very useful to broaden quality concept of construction industry to a more efficient form which should include financial parameters.
- DMAIC can be helpful to increase quality and quantity at the same time and it will affect technical and

financial success of project considerably.

- It can be said that adoption of Six Sigma to construction context can be realized by combination of existing quality initiatives and Six Sigma.
- Due to incomplete adoption of Six Sigma tools and high numbers of unrepeatable tasks of construction site operations Six Sigma should be discussed more and updated based on the characteristics of construction industry.
- In our research study after applying the 6 Sigma to the project we can reduce duration of the project by 140 days ie almost 4-5 months and reduce cost of the project by almost 21L, and also reduce cost ie. Labour cost of the project for 140 days.

Recommendation

This research mostly has focused on cost, duration and management aspects of Six Sigma and it does not include any quantitative results which might justify the positive effects of Six Sigma especially based on quality and performance. Each and every construction site can't implement 6 sigma to their sites that sites can implement ISO9001 to their sites.

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