ISSN : 2454-9924 RESOURCE SCHEDULING IN RESIDENTIAL BUILDING CONSTRUCTION BY CONSIDERING COST AND TIME

VIGNESH.N¹, VINOTH²

I(CIVIL ENGINEERING, MAHENDRA INSTITUTE OF ENGINEERING AND TECHNOLOGY, INDIA

2(CIVIL ENGINEERING, MAHENDRA INSTITUTE OF ENGINEERING AND TECHNOLOGY, INDIA

ABSTRACT: Construction management is an important branch civil engineering, which deals with effective and efficient management of any construction work. In the construction project, time and cost are the most important factors to be considered in the planning of every project. The aim of project is to finish the projects on time, within budget and to achieve other project objectives. It is a difficult task undertaken by project managers in practice, which include constantly measuring progress, evaluation of plans, and corrective actions should be taken whenever required. The essentials of construction management are functional utility, structural stability, economy, speed and quality of construction. In this thesis work, estimation and costing of the residential building in terms of optimization time and cost. For this particular building, analysis is going to be performed in terms of optimizing time and cost. In analysis part, for this building scheduling will be performed by using **MS PROJECT.** The engineering economy study involves computing a specific economic measure of worth for estimated cash flows over a specific period of time. Then factors are introduced to increase the duration of the project, then by schedule crunching and project crashing technique optimization of time and cost will be found ensured early completion of the project. This paper analyzes resource constrained project using Microsoft Project by resource leveling and compares the time cost implications with scheduled time and estimated cost.

I. INTRODUCTION

1.1 BACKGROUND

A project is an organization of cost, time and risk and the maximal quality simultaneously. People dedicated to the deployment of a set of resources for a specific purpose or objective.

Total project costs include both direct costs and indirect costs of performing the activities of the project. Direct costs for the project include the costs of materials, labor, equipment, and subcontractors. Indirect costs, on the other hand, are the necessary costs of doing work which cannot be related to a particular activity, and in some cases cannot be related to a specific project. Thus, planners perform what is called time-cost trade-off analysis to shorten the project duration. This can be done by selecting some activities on the critical path to shorten their duration.

Construction managers need to develop a schedule for directing and controlling resources of workers, machines, and materials in a coordinated and timely fashion in order to deliver a project within the limited funding and time available Trade-off between these conflicting aspects of project is a challenging job and as such planners are faced with numerous possible combinations for project delivery.



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In large scale project preparing accurate and workable schedules with consideration of resources is very difficult task, for this use of project management software's like MSP, Primavera can be advantageous. Resource conflict or over allocation can be resolved in Microsoft Project 2013 by delaying activities, splitting certain task or updating task automatically. When project levels resources, assignments are distributed and rescheduled.

1.2 SCOPE OF WORK

The main goal of the project is to finish the project with minimum cost and within the time. This model will better handle in areas such as resource constraints, time and cost overrun during the construction. It gives clear idea how to finish the project within the predefined deadline.

II RESULTS AND DISCUSSION

Sites are visited to perform questionnaire survey. Usually, a questionnaire consists of a number of questions that the respondent has to answer in a set format. While questionnaires are inexpensive, quick, and easy to analyze. The main aim of this survey is to find out factors affecting the project in terms of time and cost. Survey was actually conducted in newly constructed buildings. Survey was conducted to engineers and owners.

2.1 RESIDENTIAL BUILDING IN CUMBUM (G+2 FLOOR)

•	DATE OF START	:	11-03-2014
•	TO BE COMPLETED	:	21-12-2015.

- 10 BE COMI LETED . 21-12-2015.
- COMPLETED ON : 25-01-2016

Nearly 25 factors were collected from literature survey and listed, and survey conducted for this factors.

2.2 ANALYSIS OF BUILDING

2.2.1 Details of building

Top 12 factors affecting time and cost from above projects are taken into an account for residential building in terms of optimizing time and cost.

From particular building, analyzes is going to be performed in terms of optimizing time and cost. In analysis part, for this building scheduling will be performed using Microsoft project. Then factors are introduced to increase the duration of the project, then by schedule crunching and project crashing technique optimization of time and cost will be found

2.2.2 PREPARATION OF DETAILED ESTIMATE

Estimation means calculating the <u>materials</u>, <u>labor</u>, and equipment needed to complete a <u>construction</u> project. The resources required for this project is obtained from detailed estimate. By estimation, resources are fed into the Microsoft project and scheduled. Total cost and duration required for the project is estimated.

2.2.3 COST ESTIMATE

Before undertaking the construction of a project it is necessary to know it probable cost. The main objective of this estimate is to enable one to know beforehand, the cost of work. So while preparing the estimate very carefully the calculations should be carried out. The actual cost of a work is known at the completion of the work. Account of all expenditure is maintained day to day during the execution of work. At the end of



ISSN : 2454-9924

completion of work the actual cost is known. The actual cost should not differ much from estimated cost. The cost of each item of work is estimated from quantities already computed.

2.2.4 SCHEDULING THE PROJECT

Project is scheduled according to the resources derived from the detailed estimate. Using the Microsoft project scheduling is done. Project is scheduled to start on 01/01/15 and to end on 10/08/15.

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	6		*	sand filling &PCC	2 days	Wed 1/14/15	Thu 1/15/15	5	unskilled, mazdoor	
	7	*	*	Raft slab barbending & shuttering	10 days	Fri 1/16/15	Thu 1/29/15	6	mason[600%],mazc	
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22	1	*	painting & finishing	4 days	Fri 4/24/15	Wed 4/29/15		painter[300%],unsk		
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*	inner wall plastering	6 days	Thu 5/14/15	Thu 5/21/15	37	mason[800%],mazc	
*	flooring	4 days	Fri 5/22/15	Wed 5/27/15	38	mason[400%],mazc	
*	painting 1st coat	6 days	Thu 5/28/15	Thu 6/4/15	39	painter[300%]	
*	shutters fixing	2 days	Fri 6/5/15	Mon 6/8/15	40	Carpenter, unskiller	
*	final fixture fixing	2 days	Tue 6/9/15	Wed 6/10/15	41	Carpenter	
*	painting final coat	4 days	Thu 6/11/15	Tue 6/16/15	42	painter[300%],unsł	
*	cleaning & handling over	2 days	Wed 6/17/15	Thu 6/18/15	43	unskilled[300%]	
*	FIRST FLOOR	72 days	Thu 4/9/15	Fri 7/17/15			
*	column upto lintel level	3 days	Tue 4/14/15	Thu 4/16/15	32FS+2 days	Barbender[300%],C	
*	lintel cum sunshade	3 days	Fri 4/17/15	Tue 4/21/15	46	Carpenter,Barbend	
*	column upto roof level	4 days	Wed 4/22/15	Mon 4/27/15	47	Barbender[200%],C	
*	roof shuttering	5 days	Tue 4/28/15	Mon 5/4/15	48	Carpenter[200%],u	
*	roof barbending	6 days	Tue 5/5/15	Tue 5/12/15	49	Barbender[300%],u	
*	electrical conduit laying	2 days	Wed 5/13/15	Thu 5/14/15	50	Barbender	
*	roof concrete	2 days	Tue 5/5/15	Wed 5/6/15	49	mazdoor[400%],un	
*	roof deshutering	4 days	Thu 5/7/15	Tue 5/12/15	52	Carpenter[200%],u	
*	ceiling plastering	5 days	Mon 5/11/15	Fri 5/15/15	53SS+2 days	mason[400%],mazc	
*	brick work	6 days	Wed 5/13/15	Wed 5/20/15	54SS+2 days	mason[700%],mazc	
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New Tasks : Manually Scheduled

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57	1	*	electrical conduit laying	3 days	Mon 5/25/15	Wed 5/27/15	56	Carpenter			
58		*	work inner wall plastering	12 days	Thu 5/28/15	Fri 6/12/15	57	mason[800%],mazo			
59	÷.	*	flooring	5 days	Mon 6/15/15		58	mason[400%],mazo			
60	i.	*	painting 1st coat	6 days		Mon 6/29/15		painter[300%],unsk			
61	1	*	shutters fixing	3 days	Tue 6/30/15		60	Carpenter, unskille			
62		*	final fixture fixing	3 days	Fri 7/3/15	Tue 7/7/15	61	Carpenter			
63	1	*	painting final coat	5 days		Tue 7/14/15	62	painter[300%],unsk			
64		*	cleaning & handling over		Wed 7/15/15		63	unskilled[300%]			
65		*	SECOND FLOOR	99 days	Tue 4/21/15	Fri 9/4/15	505010.1	Daukanala facatra			
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69	÷.	*	roof shuttering	6 days	Mon 5/25/15		68	Carpenter[200%],u			
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71		*	electrical conduit laying	2 days	Thu 6/11/15	Fri 6/12/15	70				
72	1	*	roof concrete	2 days	Tue 6/2/15	Wed 6/3/15	69	mazdoor[400%],un			
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Project Schedule

2.2.5 INCREASED PROJECT SCHEDULE

Now the factors affecting the project is introduced. Due to some factors like shortage of materials, cash flow project duration is increased and new schedule is formed. Second floor should start on 04/21/15 but



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started on 06/10/15.Later crunching and crashing technique will be used for optimizing the construction time and cost.

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	3	+	*	lintel cum sunshade	3 days	Thu 5/14/15	Mon 5/18/15	67	Carpenter, Barben	4	
	4	÷	*	column upto roof level	4 days	Tue 5/19/15	Fri 5/22/15	68	Barbender[200%],	c	
	5	+	*	roof shuttering	6 days	Mon 5/25/15	Mon 6/1/15	69	Carpenter[200%],	1	
	6	+	*	roof barbending	7 days	Tue 6/2/15	Wed 6/10/15	70	Barbender[300%],	u	
	7		*	electrical conduit laying	2 days	Thu 6/11/15	Fri 6/12/15	71			
	8		*	roof concrete	2 days	Tue 6/2/15	Wed 6/3/15	70	mazdoor[400%],ur	1	
	9		*	roof deshutering	4 days	Fri 6/19/15	Wed 6/24/15	73FS+11 days	Carpenter[200%],	1	
santt Chart	10	+	*	ceiling plastering	5 days	Tue 6/23/15	Mon 6/29/15	74SS+2 days	mason[400%],maz	c	
2	11	+	*	brick work	8 days	Thu 6/25/15	Mon 7/6/15	75SS+2 days	mason[700%],maz	c	
g	12	+	*	doors & windows frame	1 2 days	Tue 7/7/15	Wed 7/8/15	76	Carpenteer[200%]	,	
	13		*	electrical conduit laying	3 days	Thu 7/9/15	Mon 7/13/15	77			
	14	•	*	inner wall plastering	12 days	Tue 7/14/15	Wed 7/29/15	78	mason[800%],maz	c	
	15	+	*	flooring	6 days	Thu 7/30/15	Thu 8/6/15	79	mason[400%],maz	c	
	16	÷	*	painting 1st coat	7 days	Fri 8/7/15	Mon 8/17/15	80	painter[300%],uns	H I	
	17	÷	*	shutters fixing	3 days	Tue 8/18/15	Thu 8/20/15	81	Carpenter, unskille	24	
	18	÷	*	final fixture fixing	3 days	Fri 8/21/15	Tue 8/25/15	82	Carpenter		
	19	ŧ.	*	painting final coat	1 day	Wed 8/26/15	Wed 8/26/15	83	painter[300%],uns	F	
	20	•	*	cleaning & handling over	r 1 day	Thu 8/27/15	Thu 8/27/15	84	unskilled[300%]	-	
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Schedule duration

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	24	1	*	DURATION	85 days	Wed 6/10/15	Tue 10/6/15				
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	28	3	*	column upto roof level	4 days	Fri 6/19/15	Wed 6/24/15	27	Barbender[200%],0		
	29	•	*	roof shuttering	4 days	Thu 6/25/15	Tue 6/30/15	28	Carpenter[200%],u		
	30	•	*	roof barbending	7.13 days	Wed 7/1/15	Fri 7/10/15	29	Barbender[300%],u		
	31	L	*	electrical conduit laying	2 days	Fri 7/10/15	Tue 7/14/15	30			
	32	2	*	roof concrete	2.63 days	Wed 7/1/15	Fri 7/3/15	29	mazdoor[400%],un		
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ţ	34	÷ 🕴	*	ceiling plastering	5 days	Wed 7/22/15	Wed 7/29/15	33SS+2 days	mason[400%],mazo		
Gantt Chart	35	5 🕴	*	brick work	8.63 days	Fri 7/24/15	Thu 8/6/15	34SS+2 days	mason[700%],mazo		
	36	5	*	doors & windows frame	2 days	Thu 8/6/15	Mon 8/10/15	35	Carpenteer[200%],		
	37	7	*	electrical conduit laying work	3 days	Mon 8/10/15	Thu 8/13/15	36			
	38	3	*	inner wall plastering	8 days	Thu 8/13/15	Tue 8/25/15	37	mason[800%],mazo		
	39	•	*	flooring	6 days	Tue 8/25/15	Wed 9/2/15	38	mason[400%],mazo		
	40	• •	*	painting 1st coat	5 days	Wed 9/2/15	Wed 9/9/15	39	painter[300%],unsl		
	41	L 🕴	*	shutters fixing	3 days	Wed 9/9/15	Mon 9/14/15	40	Carpenter, unskille		
	42	2	*	final fixture fixing	3 days	Mon 9/14/15	Thu 9/17/15	41	Carpenter		
	43	3	*	painting final coat	7 days	Thu 9/17/15	Mon 9/28/15	42	painter[300%],uns		
	44	•	*	cleaning & handling ove	r 2 days	Mon 9/28/15	Wed 9/30/15	43	unskilled[300%]		
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Increased duration



2.3 TECHNIQUES TO OVERCOME FACTORS

2.3.1 Schedule Crunching

Crunching is a period of time in which one must make a effort quickly in order to finish the project. In this technique increased duration and cost of a project can be reduced. But Crunching should be of optimum, otherwise it leads to poor in quality. By using this crunching technique the duration of project reduced from 85 days to 67 days.

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	1		*	SECOND FLOOR	67 days	Wed 6/10/15	Thu 9/10/15			85 days	
E	2	÷	*	column upto lintel level	2 days	Wed 6/10/15	Thu 6/11/15		Barbender[300%],C	3 days	
E	3		*	lintel cum sunshade	3 days	Fri 6/12/15	Tue 6/16/15	2	Carpenter,Barbend	4 days	
	4	•	*	column upto roof level	3 days	Wed 6/17/15	Fri 6/19/15	3	Barbender[200%],C	4 days	
E	5	•	*	roof shuttering	4 days	Mon 6/22/15	Thu 6/25/15	4	Carpenter[200%],u	6 days	
Г	6	•	*	roof barbending	5 days	Fri 6/26/15	Thu 7/2/15	5	Barbender[300%],u	7 days	
E	7		*	electrical conduit laying	1 day	Fri 7/3/15	Fri 7/3/15	6		2 days	
г	8		*	roof concrete	2 days	Fri 6/26/15	Mon 6/29/15	5	mazdoor[400%],un	2 days	
:	9	•	*	roof deshutering	3 days	Wed 7/15/15	Fri 7/17/15	8FS+11 days	Carpenter[200%],u	4 days	
	10	•	*	ceiling plastering	4 days	Fri 7/17/15	Wed 7/22/15	9SS+2 days	mason[400%],mazc	5 days	
	11	+	*	brick work	6 days	Tue 7/21/15	Tue 7/28/15	10SS+2 days	mason[700%],mazc		-
2	12	•	*	doors & windows frame t	1 day	Wed 7/29/15	Wed 7/29/15	11	Carpenteer[200%],	2 days	
	13		*	electrical conduit laying	2 days	Thu 7/30/15	Fri 7/31/15	12		3 days	
	14	•	*	inner wall plastering	9 days	Mon 8/3/15	Thu 8/13/15	13	mason[800%],mazc	12 days	
	15	•	*	flooring	4 days	Fri 8/14/15	Wed 8/19/15	14	mason[400%],mazc	6 days	
	16	+	*	painting 1st coat	4 days	Thu 8/20/15	Tue 8/25/15	15	painter[300%],unsk	7 days	
	17	•	*	shutters fixing	2 days	Wed 8/26/15	Thu 8/27/15	16	Carpenter, unskille	3 days	
	18		*	final fixture fixing	2 days	Fri 8/28/15	Mon 8/31/15	17	Carpenter	3 days	
	19		*	painting final coat	5 days	Tue 9/1/15	Mon 9/7/15	18	painter[300%],unsk	5 days	
	20	•	*	cleaning & handling over	1 day	Tue 9/8/15	Tue 9/8/15	19	unskilled[300%]	2 days	
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1			85 days		\$0.00	67 days	\$	0.00
2		Barbender[300%],C		Ś	23,643.75		\$17.20	
3	2	Carpenter, Barbend			10,612.50	•	\$10,05	i0.00
4	3	Barbender[200%],C			, 18,900.00		\$13,80	0.00
5	4	Carpenter[200%],u	6 days	\$	14,400.00	4 days	\$9,60	0.00
6	5	Barbender[300%],u	7 days	\$	20,787.50	5 days	\$14,68	7.50
7	6		2 days		\$0.00	1 day	\$	\$0.00
8	5	mazdoor[400%],un	2 days		\$7,600.00	2 days	\$7,15	0.00
9	8FS+11 days	Carpenter[200%],u	4 days		\$6,400.00	3 days	\$4,80	0.00
10	9SS+2 days	mason[400%],mazo	5 days	\$	18,750.00	4 days	\$15,00	0.00
11	10SS+2 days	mason[700%],mazo		\$	69,968.75	6 days	\$51,46	i8.75
12	11	Carpenteer[200%],	2 days		\$4,800.00	1 day	\$2,40	0.00
13	12		3 days		\$0.00	2 days	\$	\$0.00
14	13	mason[800%],mazo	12 days	\$1	00,800.00	9 days	\$75,60	0.00
15	14	mason[400%],mazo	6 days	\$	22,575.00	4 days	\$14,17	5.00
16	15	painter[300%],unsk	7 days	\$	18,900.00	4 days	\$10,80	0.00
17	16	Carpenter, unskille	3 days		\$4,200.00	2 days	\$2,80	10.00
18	17	Carpenter	3 days		\$1,800.00	2 days	\$1,20	10.00
19		painter[300%],unsk	5 days	\$	13,500.00	5 days	\$10,50	
20	19	unskilled[300%]	2 days		\$2,400.00	1 day	\$1,20	10.00
	📌 New Tasks : Ma	nually Scheduled						

Duration Reduced by Schedule Crunching



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genre	Second Floor	Head Room	Terrace Floor	External Works	TOTAL COST	SAVINGS	
orginal	3,00,035	44,087	60,112	92,600	4,96,834	97,974	
crunching	2,62,430	32,955	39,525	63,950	3,98,860		

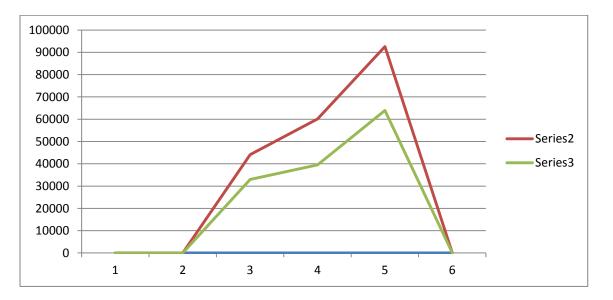


FIG 4.3.1.1 GRAPH OF SCHEDULED AND CRUNCHED

ORGINAL COST	
CRUNCHED COST	Increased duration =60 days
	Duration reduced = 17 days

2.3.2Project Crashing

Crashing means adding of additional resources to a project in order to finish the project in a specific deadline. But adding of resources should be optimum it should not affect the cost of the project. By using this crunching technique the duration of project reduced from 85 days to 59 days. There are a number of standard and typical approaches to attempting to crash a project schedule. One of the most commonly utilized methods involves increasing the assignment of resources on schedule activities. This essentially means decreasing the time it takes to perform individual activities by increasing the number of people working on those activities.



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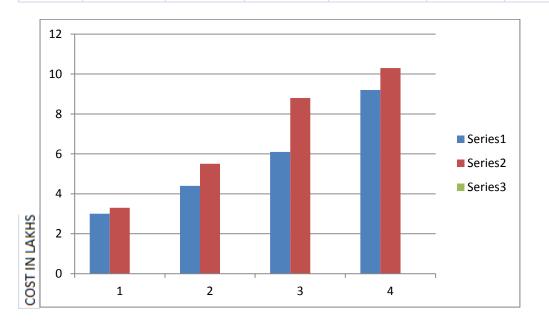
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			Task 🖕 Mode	Task Name 👻	Duration 🖕	Start 👻	Finish 👻	Predecessors 🖕	Resource Names 🖕	Baseline Duration 🖕	Base
	1		*	DURATION	59 days	Wed 6/10/15				81 days	
	2		*	SECOND FLOOR	54 days	Wed 6/10/15	Mon 8/24/15			81 days	
	3	1	*	column upto lintel level	2 days	Wed 6/10/15	Thu 6/11/15		Barbender[300%],C	3 days	
	4	•	*	lintel cum sunshade	2 days	Fri 6/12/15	Mon 6/15/15	3	Carpenter,Barbend	4 days	
	5	•	*	column upto roof level	3 days	Wed 6/17/15	Fri 6/19/15	4	Barbender[200%],C	4 days	
	6	•	*	roof shuttering	2 days	Mon 6/22/15	Tue 6/23/15	5	Carpenter[200%],u	6 days	
	7	ŧ.	*	roof barbending	5 days	Fri 6/26/15	Thu 7/2/15	6	Barbender[300%],u	7 days	
	8		*	electrical conduit laying	1 day	Fri 7/3/15	Fri 7/3/15	7		2 days	
	9	+	*	roof concrete	2 days	Fri 6/26/15	Mon 6/29/15	6	mazdoor[400%],un	2 days	
Cuart	10	+	*	roof deshutering	2 days	Wed 7/15/15	Thu 7/16/15	9FS+11 days	Carpenter[200%],u	4 days	
Ĕ	11	÷	*	ceiling plastering	3 days	Fri 7/17/15	Tue 7/21/15	10SS+2 days	mason[400%],mazo	5 days	
3	12	+	*	brick work	6 days	Tue 7/21/15	Tue 7/28/15	11SS+2 days	mason[700%],mazo	8 days	
	13	+	*	doors & windows frame	1 day	Wed 7/29/15	Wed 7/29/15	12	Carpenteer[200%],	2 days	
	14		*	electrical conduit laying	1 day	Thu 7/30/15	Thu 7/30/15	13		3 days	
	15	+	*	inner wall plastering	6 days	Mon 8/3/15	Mon 8/10/15	14	mason[800%],mazo	12 days	
	16	+	*	flooring	4 days	Fri 8/14/15	Wed 8/19/15	15	mason[400%],mazo	6 days	
	17	+	*	painting 1st coat	3 days	Thu 8/20/15	Mon 8/24/15	16	painter[300%],unsk	7 days	
	18	+	*	shutters fixing	1 day	Wed 8/26/15	Wed 8/26/15	17	Carpenter, unskille	3 days	
	19		*	final fixture fixing	1 day	Fri 8/28/15	Fri 8/28/15	18	Carpenter	3 days	
	20	+	*	painting final coat	4 days	Tue 9/1/15	Fri 9/4/15	19	painter[300%],unsl	5 days	
	21	+	*	cleaning & handling over	1 day	Tue 9/8/15	Tue 9/8/15	20	unskilled[300%]	2 days	
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ी PI	ROJEC	T CRASHING										
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		Predecessors 🖕	Resource Names 🖕	Baseline Duration	Baseline Cost	-	Duration	-	Cost	-	Add New Col	umn
	1		1	81 days		\$0.00	59 days			\$0.00		
E	2			81 days		-	54 days			\$0.00		
E	з		Barbender[300%],C		s	23,643.75				\$22,481.21		
E	4	3	Carpenter, Barbend	,		10,612.50				\$11,732.11		
Ŀ	5	4	Barbender[200%].C	,		18,900.00				\$19.080.00		
E	6	5	Carpenter[200%],u	6 days		14,400.00				\$9,440.00		
E	7	6	Barbender[300%],u	7 days	Ś	20,787.50	5 days			\$22,254.56		
	8	7		2 days		\$0.00	1 day			\$0.00		
	9	6	mazdoor[400%],un	2 days		\$7,600.00	2 days			\$8,043.87		
	10	9FS+11 days	Carpenter[200%],u	4 days		\$6,400.00	2 days			\$5,520.00		
	11	10SS+2 days	mason[400%],mazc	5 days	\$	18,750.00	3 days			\$16,227.78		
	12	11SS+2 days	mason[700%],mazc	8 days	\$	69,968.75	6 days			\$64,635.95		
	13	12	Carpenteer[200%],	2 days		\$4,800.00	1 day			\$2,400.00		
	14	13		3 days		\$0.00	1 day			\$0.00		
L	15	14	mason[800%],mazc	12 days	\$	37,900.00	6 days			\$60,141.82		
	16	15	mason[400%],mazc	,		22,575.00				\$50,911.29		
	17	16	painter[300%],unsł			18,900.00				\$14,820.00		
	18	17	Carpenter, unskille	,		\$4,200.00				\$3,720.00		
	19	18	Carpenter	3 days		\$1,800.00				\$600.00		
	20	19	painter[300%],unsł			13,500.00				\$14,213.79		
	21	20		2 days		\$2,400.00	1 day			\$1,720.00		
dy	2	🏲 New Tasks : Mani	ually Scheduled									

Duration Reduced By Crashing

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Mon	Start										Finish Mon 10/1
	Resource Name	▼ Type ▼	Material	Initials 🔻	Group 🔫	Max. 🔻	Std. Rate 🔻	Ovt. Rate 🔻	Cost/Use 🔻	Accrue At 🔻	Base Calend
1	mason	Work		m		2,000%	\$75.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
2	mazdoor	Work		m		1,900%	\$56.25/hr	\$0.00/hr	\$0.00	Prorated	Standard
з	cement	Material	1bag	с			\$300.00		\$0.00	Prorated	
4	sand	Material	100cu.ft	s			\$5,000.00		\$0.00	Prorated	
5	brick	Material	1 load	b			\$19,000.00		\$0.00	Prorated	
6	aggregate	Material	100cu.ft	а			\$2,800.00		\$0.00	Prorated	
7	steel	Material		s			\$0.00		\$0.00	Prorated	
8	lime	Material		1			\$0.00		\$0.00	Prorated	
9	paint	Material	1 litre	р			\$200.00		\$0.00	Prorated	
10	tiles	Material		t			\$0.00		\$0.00	Prorated	
11	teak work	Material		t			\$0.00		\$0.00	Prorated	
12	stone masonry	Material	sq.ft	s			\$40.00		\$0.00	Prorated	
13	painter	Work		р		800%	\$62.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
14	operater	Work		0		100%	\$75.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
15	unskilled	Work		u		1,800%	\$50.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
16	barbender	Work		b		800%	\$56.25/hr	\$0.00/hr	\$0.00	Prorated	Standard
17	carpenter	Work		с		800%	\$75.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
18	polisher	Work		р		900%	\$0.00/hr	\$0.00/hr	\$0.00	Prorated	Standard
]					
4											
dy	📌 New Tasks : Manual	lly Scheduled									

Genre	Second Floor	Head Room	Terrace Floor	External Works	Total Cost	Savings
orginal	3,00,035	44,087	60,112	92,600	4,96,834	88,532
crashing	3,37,937	55,343	88,821	103,265	5,85,366	



GRAPH OF SCHEDULED AND CRASHED



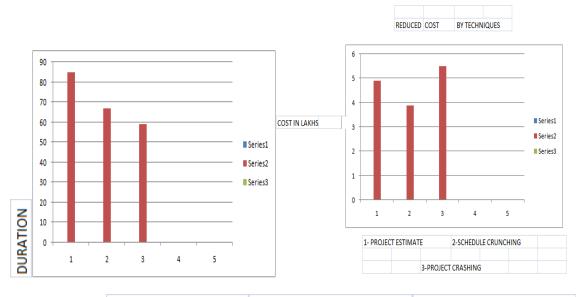


2.3.3 Comparison of Technique

GENRE	COST SAVED & INCRE	ASED
PROJECT ESTIMATE	4.9	LAKHS
SCHEDULE CRASHING	3.9	LAKHS
PROJECT CRASHING	5.8	LAKHS

GENRE	DURATION REDUCED		
PROJECT ESTIMATE	85	DAYS	
SCHEDULE CRASHING	67	DAYS	
PROJECT CRASHING	59	DAYS	

REDUCED DURATION BY TECHNIQUES



1= PROJECT ESTIMATE 2= SCHEDULE CRUNCHING 3=PROJECT CRASHING

FIG: 4.3.3 Comparison of Technique

III CONCLUSION AND FUTURE STUDY

Many project managers suffer to finish the project within the duration and estimated cost. They may add more resources to finish the project within the duration or they finish the project by delay. From the result, It is found schedule crunching is most effective technique in optimization of time and cost. But quality is not guaranteed in this technique. If project duration is decreased of optimum ,then we can achieve quality by this technique. In order to achieve more profit we should not reduce than optimum it may lead to collapse and to do rework. In order to achieve quality project crashing is a good technique. Thus optimization of time and cost is achieved.

SCOPE FOR FURTHER STUDY

• In schedule crunching technique how far the duration can be reduced in terms of not reducing the quality of the project can be studied.



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