

## COMPARATIVE STUDY ON INNOVATIVE MATERIALS Vs TRADITIONAL MATERIALS IN CONSTRUCTION WITH RESPECT TO COST AND TIME

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**ABSTRACT:** In conventional method of construction there are many natural resources is been wasted. Making of conventional materials also creates pollution and some environmental effects. The size and weight of the conventional materials in construction plays a main role in fixing the prices for productivity and total estimate of the project due to the demand of the conventional materials. So implementing the innovative materials in construction project will reduce the demand of conventional materials in practice, also the manufacturing of the innovative materials are eco-friendly. The size and shape of the conventional materials are irregular, but innovative materials are manufactured by machines so the materials can be made in various sizes and shapes. Also the innovative materials are light in weight which will reduce the dead load of the structure and also make some design changes, size and light weight increases productivity in low cost.

Therefore the innovative materials can bring a positive change in both structural and management aspect of the project with respect to cost and time.

*Keywords: gypsum plastering, AAC blocks, prefabricated structures, pvc and upvc door window panels.*

### INTRODUCTION

#### TRADITIONAL CONSTRUCTION MATERIALS

The traditional construction materials areas of now is not well equipped for the current scenario where the cost and time are valued the most. But when the factors are considered in innovative materials is trusted to be the best suitable construction materials for the current scenario. Even

though the innovative material has so many advantages in cost and time, there are some factors in it which does not attract the market as the traditional materials does. Since, traditional materials of construction has some advantages over the innovative materials in its labour availability, costing as well as the consumer reliability, many of the clients and contractors were not encouraging innovative materials in construction till now.

#### INNOVATIVE MATERIALS IN CONSTRUCTION

In this project we are going to compare few innovative materials which are used in modern construction practice and also comparing the merits and demerits of the innovative materials and analyzing the impact in both project schedule and cost for both innovative materials and traditional materials. The innovative materials chosen are as follows:

- Gypsum Plastering
- PVC and UPVC panel doors and windows
- Pre-fabricated building materials

#### DATA COLLECTION

##### GENERAL

In conventional method of construction there are many natural resources is been wasted. Making of conventional materials also creates pollution and some environmental effects. The size and weight of the conventional materials in construction plays a main role in fixing the prices for

productivity and total estimate of the project due to the demand of the conventional materials. So implementing the innovative materials in construction project will reduce the demand of conventional materials in practice, also the manufacturing of the innovative materials are eco-friendly. The size and shape of the conventional materials are irregular, but innovative materials are manufactured by machines so the materials can be made in various sizes and shapes. Also the innovative materials are light in weight which will reduce the dead load of the structure and also make some design changes, size and light weight increases productivity in low cost.

Therefore the innovative materials can bring a positive change in both structural and management aspect of the project with respect to cost and time.

### MATERIAL SELECTION

About eleven materials list is been prepared for this project. Various properties like size, durability, strength, texture and performance are considered for the material selection process. The listed materials are

- Gypsum plastering
- Laminate flooring
- PVC & UPVC panel doors and windows
- Water repellent paint
- AAC blocks and Interlocking blocks
- Curing compound
- Sticker flooring and wall stickers
- M sand and fly ash
- Rice husk ash
- False ceiling and other interior works
- Pre-fabricated structures
- Gladding materials

Out of the above mentioned eleven materials three materials have been chosen to proceed the project. The chosen materials create a good impact in both project schedule and project cost. The selected materials are

- Gypsum Plastering
- PVC and UPVC panel doors and windows
- Pre-fabricated building materials

### PLAN

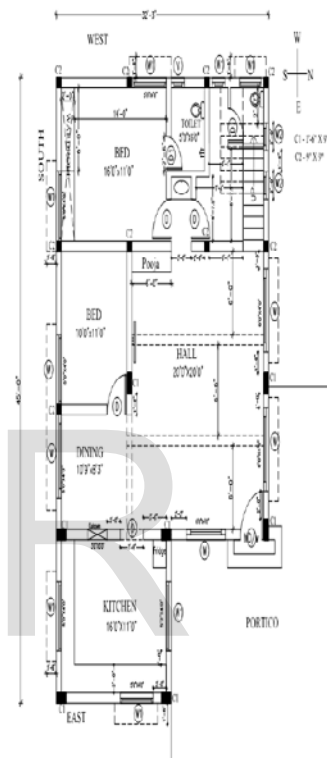


Figure 1.1 GF-With Column

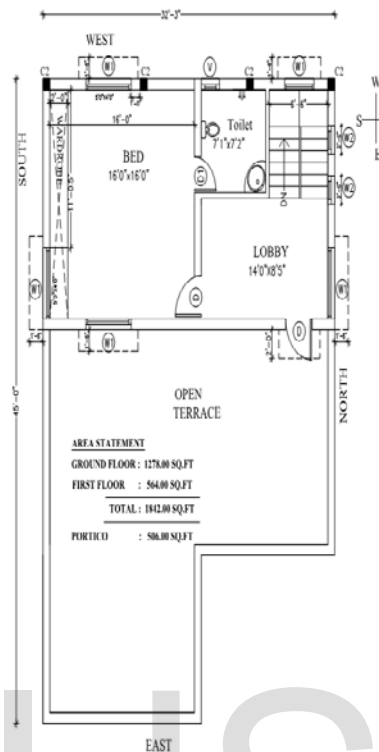


Figure 1.2 FF-With Column

**PREPARING ESTIMATE AND SCHEDULE FOR NORMAL BUILDING MATERIALS**

A schedule or a timetable, as a basic time-management tool, consists of a list of times at which possible tasks, events, or actions are intended to take place, or of a sequence of events in the chronological order in which such things are intended to take place. The process of creating a schedule - deciding how to order these tasks and how to commit resources between the varieties of possible tasks - is called scheduling, and a person responsible for making a particular schedule may be called a scheduler. Making and following schedules is an ancient human activity.

Some scenarios associate "this kind of planning" with learning "skills". Schedules are necessary, or at least useful, in situations where

individuals need to know what time they must be at a specific location to receive a specific service, and where people need to accomplish a set of goals within a set time period.

Schedules can usefully span both short periods, such as a daily or weekly schedule, and long-term planning with respect to periods of several months or years. They are often made using a calendar, where the person making the schedule can note the dates and times at which various events are planned to occur. Schedules that do not set forth specific times for events to occur may instead list algorithmically an expected order in which events either can or must take place.

**ESTIMATE**

The detailed estimate of the sample residential building is been prepared manually with using the construction of using traditional construction materials.

This estimate includes materials which has to be compared with the innovative materials like gypsum plastering, PVC and UPVC panel doors and windows, Pre-Engineering buildings.

**Abstract and Estimate for traditional materials**

<b>ABSTRACT for HSB 84 House</b>						
<b>S. No</b>	<b>Description</b>	<b>Unit</b>	<b>Qty</b>	<b>Rate</b>	<b>Amount</b>	<b>Area</b>
1	PCC 1:5:10	Cum	15	2996	45207	<b>1842</b>
2	RR Work	Cum	202	2996	60509	
3	Earth Filling	Cum	915	1753	15873	

		S	1		
		q	5		75
4	DPC Course	ft	0	50	00
		M	4.	50	21
5	Steel Fabrication	T	3	00	50
		C			18
6	RCC 1:2:4	u	7	26	54
		m	0	51	90
		C	1		38
7	Brickwork 9"	u	0	36	87
		m	5	94	15
		S	1		48
8	Brickwork 4"	q	0	46	11
		m	3	9	3
		S	1		45
9	Plastering CM 1:3	q	7	25	94
		m	9	6	0
		S	8		17
10	Plastering CM 1:5	q	7	19	24
		m	6	7	80
		S	1		25
11	Open Terrace Flooring	q	7		52
		ft	6	20	0
		S	1		28
12	Flooring Tiles	q	8	18	81
		ft	4	2	87
		S	5		50
13	Kit & Bath room Tiles	q	9		84
		ft	9	85	0
		S			21
14	Granite works(bath+ kit slab)	q		25	00
		ft	8	0	00
		S	2		34
15	Teak Wood Main Door	q	3	15	50
		ft	0	00	0
		S	1		66
16	Flush Door	q	2	55	00
		ft	0	0	0
		S	3		19
17	UPVC Windows	q	5	0	25

		with grill	ft	0		00
		S	5			50
18	Tiles for Portico	q	0	10	60	0
		ft	6	0	0	0
		S				23
19	Granite for Steps	q		25	75	
		ft	9	0		
		S	1			22
20	Granite for steps(Staircase)	q	1	20	57	
		ft	3	0	8	
		L.				10
21	Electrical LS	S	0		00	
		L.				10
22	Plumbing LS	S			00	
		R	1	60	90	
23	SS Hand Rail	ft	5	0	00	
		R	8	10	87	
24	MS Handrails & Elevation Grills	ft	7	0	00	
		L.				30
25	External CP Fittings (Jaquar)	S			0	
		L.				30
26	Sanitary Fittings (Parryware)	S			0	
		N				30
27	Inspection chambers	o	1	30	00	
		s	0	00	0	
		S	1			14
28	Painting & Polishing	q	4		73	
		ft	2	80	60	
		S	1			46
29	Labourcharges	q	8		05	
		ft	4	25	00	
		s	5			55
30	Portico Roofing	q	0	11	66	
		t	6	0	0	
						<b>289</b>
						<b>124</b>
						<b>6</b>

**Abstract and Estimate for Gypsum plastering**

<b>ABSTRACT for HSB 84 House</b>						
S. No	Description	Unit	Qty	Rate	Amount	Area
1	PCC 1:5:10	Cum	15	29.96	452.07	18.42
2	RR Work	Cum	20.2	29.96	605.09	
3	Earth Filling	Cum	9.1	17.5	158.73	
4	DPC Course	Sqft	15	50	750	
5	Steel Fabrication	MT	4.3	50.00	215.00	
6	RCC 1:2:4	Cum	7.0	26.51	185.49	
7	Brickwork 9"	Cum	10.5	36.94	388.71	
8	Brickwork 4"	Sqm	10.3	46.9	481.13	
9	Plastering CM 1:3	Sqm	17.9	13.0	233.31	
10	Plastering CM 1:5	Sqm	8.7	70.16	613.16	
11	Open Terrace Flooring	Sqft	27.6	9.20	255.20	

1		Sqft	15.8			
2	Flooring Tiles	sqft	18.4	2	288	187
1	Kit & Bath room Tiles	Sqft	9.9	85	508	40
1	Granite works(bath+ kit slab)	Sqft	8.0	25	210	0
1	Teak Wood Main Door	Sqft	2.3	15.00	34.50	0
1	Flush Door	Sqft	1.2	55.00	66.00	0
1	UPVC Windows with grill	Sqft	3.5	55.00	192.50	500
1	Tiles for Portico	Sqft	5.6	10.00	56.00	506
1	Granite for Steps	Sqft	9.0	25.00	225.00	237
2	Granite for steps(Staircase)	Sqft	1.3	20.00	26.00	78
2	Electrical LS	L.S	0		100	000
2	Plumbing LS	L.S			100	000
2	SS Hand Rail	Rft	1.5	60.00	90.00	0
2	MS Handrails & Elevation Grills	Rft	8.7	10.00	87.00	0
2	External CP Fittings (Jaquar)	L.S			300	00
2	Sanitary Fittings (Parryware)	L.S			300	00

27	Inspection chambers	N o s	1 0	30 00	300 00	
28	Painting & Polishing	S q f t	1 8 4 2			147 360
29	Labourcharge	S q f t	1 8 4 2	25 0	460 500	
30	Portico Roofing	sq ft	5 0 6	11 0	556 60	## ## ##

## CONCLUSION

The innovative materials is now been a beneficial methodology if the time, quality factor are considered. But the monolithic construction also shows some advantages in terms of labour availability, cost factor and consumer reliability are considered. In this study the advantages of both the materials are been studied. A plan common for the innovative and traditional construction materials has been identified and the cost and schedule estimates for total innovative materials construction, total traditional materials in construction, and the various combinations has to be prepare and compare to obtain optimum result in terms of cost and schedule. From the study it is clear that the innovative materials takes some changes than that of traditional materials of construction. Where as the cost may increase or decrease while using the innovative materials in construction. According the client needs and time of completion the innovative materials may save some time which will be beneficial in term.

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