International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

APPLICATION OF VALUE ENGINEERING IN BUILDING CONSTRUCTION

Saganti Swetha1, Nalagoppula Ramya Smruthi[2], Md. Aleem[3]

[1]M.Tech Student, Department Of CIVIL Engineering,
VIDYA VIKAS Institute of technology Hyderabad, (India)
[2]Asst.Professor, Department of CIVIL Engineering,
VIDYA VIKAS Institute of technology Hyderabad, (India)
[3]Head of the Dept, Department of CIVIL Engineering,
VIDYA VIKAS Institute of technology Hyderabad, (India)

ABSTRACT

The current economic conditions have entailed the use of rational method and techniques and research and application of new techniques by utilizing advancements in technology in the field of production as well as in every field. Excess cost control requires to be maintained throughout the project life of building beginning from the initial stages of design. Scrutinizing the project well and considering all possible alternatives particularly in design stage are important for achieving optimum cost.

The Value Engineering is an intensive, interdisciplinary problem solving activity that focuses on improving the value of the functions that are required to accomplish the goal, or objective of any product, process, service, or organization. Value Engineering stands to a reason that any technique so useful should be applied to every product, and at each stage of the normal day-to-day development of a building construction product. The practice of this technique requires a certain amount of expense, which may get justified by potential cost savings.

In this present work how the principles of value engineering are applied in construction project is explained with selected site named GK's (PRIDE) , which has 500flats in it. As the part of project work collected the information regarding costs and time taken to install all the individual elements in the construction and all the information of the elements that are used in construction and the data collected is being processed in PRIMAVERA (P6).

Key Words: Value Engineering, Building Construction), Cost, PRIMAVERA(P6).

I. INTRODUCTION

Value engineering (VE) is a systematic method to improve the "value" of goods or products and services by using an examination of function. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost.

The Value Engineering technique directed toward analyzing the functions of an item or process to determine best

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

value or the best relationship between worth and cost. Best value is represented by an item or process that performs the required basic function and has the lowest life cycle cost. In this context the application of value engineering yield a better value when construction is approached in a manner that incorporates environmentally-sound and energy efficient practices and materials. However the real objective of value engineering is value improvement and that may not result in an immediate reduction in cost. Value engineering can be used for the following benefits.

1. Cost reduction
2. Time savings
3. Quality improvement
4. Isolation of design deficiencies

Value engineering is thus not simply a cost cutting method but improving value for service by modifying and enhancing functions. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. Reasons for poor value can be that, lack of information, decisions based on wrong beliefs, habitual thinking, negative attitudes, and reluctance to seek advice, shortage of time, changing technology, and lack of yard stick to measure value, old specifications and poor human relations. Value engineering gets closer to cost control because it looks at ways to reduce cost on specific items or activities. However, it does not look at the total project picture or check the daily performance it focuses only on specific items in the designs, procurement or construction area.

Value=function/overall cost

II. SCOPE OF THE PROJECT AND METHODOLOGY

Methodology: Value engineering is often done by a step by step methodology. The following is the step by step procedure used:

i. Visit a site
ii. Identify all the functions, cost, time taken by individual elements in a Project.
iii. Prepare a Checklist for each and every element.
iv. Prepare a Tabular Format to note down all the information regarding every element.
v. Process the data collected in PRIMAVERA
vi. Identify the main elements among them.
vii. Develop alternative solutions for delivering those functions
viii. Generate a report from PRIMAVERA comparing the variation obtained after using alternative materials

For this a six phases procedure which is called the "value analysis job plan." is used.Now the modern version has 8 phases in it. They are:

I. Orientation phase
II. Information phase
III. Functional phase
IV. Creative phase

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

V. Analysis phase

VI. Development phase

DATA COLLECTION

S. NO	MATERIAL USED	GRADE OR QUALITY OF MATERIAL			TIME TAKEN (DAYS)	MAN POWER REQUIRED	MACHINERY NAME, NO. & COST/HR OR DAY	DIMENSION OF WORK AREA			COST/ UNIT SFT (OR) CFT	PROMISES FROM OWNER
		1st	2nd	3rd				L	B	H		
1	**Earth work** Red soil		√		30 days	2	Crawler mounted Excavator @ 1500 Rs/hr	156'9'	(88'6" + 86'6") / 2	18'	25 rs/cft	----No----
2	**Concrete in foundation** Cement, sand, steel (step footing)	√			5 hrs/ footing [30 days for 82 footing]	5 ppl/ day/footing [410 ppl/ 82 footing]	Pin vibrator @1000 rs/ day	6'9" S_w= 21"	6'	D_e=12" D_s=10'		Fe 500 grade
3	**Soil filling** Excavated Soil	√			15 days	15 people/ day	Compacting vibrator, Roller @ 3000 rs/ day	156'9'	(88'6" + 86'6") / 2	6'	21rs/cft	Compactor done till SBC=35 T/m^2

4	**Brick work** Clay bricks (Red) Size: (9"x4"x3") Cost: 6 rs/ brick	√			5 days/ 1800 ft	6 people/ day	-------		4" 9"	10' 10'	40 rs/sft 67 rs/sft [including cement]	Good Quality Bricks
5	**Lintels over openings** Concrete steel		√			2 people	-----	6' 4'	9" 6"	9" 6"	91Rs/sft	----No----
6	**Elevator or lift** Head rooms Steel ropes		√		3 months after ordering 15days to install for 7 slabs	3people /day (company professionals)	Motors (Company)	5'6"	5'6"	10'/floor	9 lakhs/7 slabs (408kg)	*Reputed make *6 passenger capacity *Entrance lobby with granite cladding
7	**Shuttering or centering** Steel,jack centering , Lubricant		√		For slab takes 8days/950 sft	15people/day	hammers				50Rs/sft	----No---

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

8	**RCC work** **i)Beams** a)cement b)steel	 √	√		25beams/ day	12people for 25beams/day	miller@1200/day lift@3000/day vibrator@600/day	-	18"	9"	425/cft	Fe500grade steel
	ii)columns a)cement b)steel	 √	√		25columns/day	12 people/day	miller@1200/day lift@3000/day vibrator@600/day	9'	18"	9"	425/cft	Fe500grade steel

DATA ANALYSIS BY USING PRIMAVERA

III. PROCEDURE USED IN PRIMAVERA

Primavera is enterprise project portfolio management software. Primavera P6 Professional Project Management is a powerful yet easy-to-use solution for planning, managing, and executing projects and programs. Primavera P6 Professional Project Management gives today's project managers and schedulers what they value most: control. Primavera P6 Professional Project Management, the recognized standard for high-performance project management software, is designed to handle large-scale, highly sophisticated, and multifaceted projects.

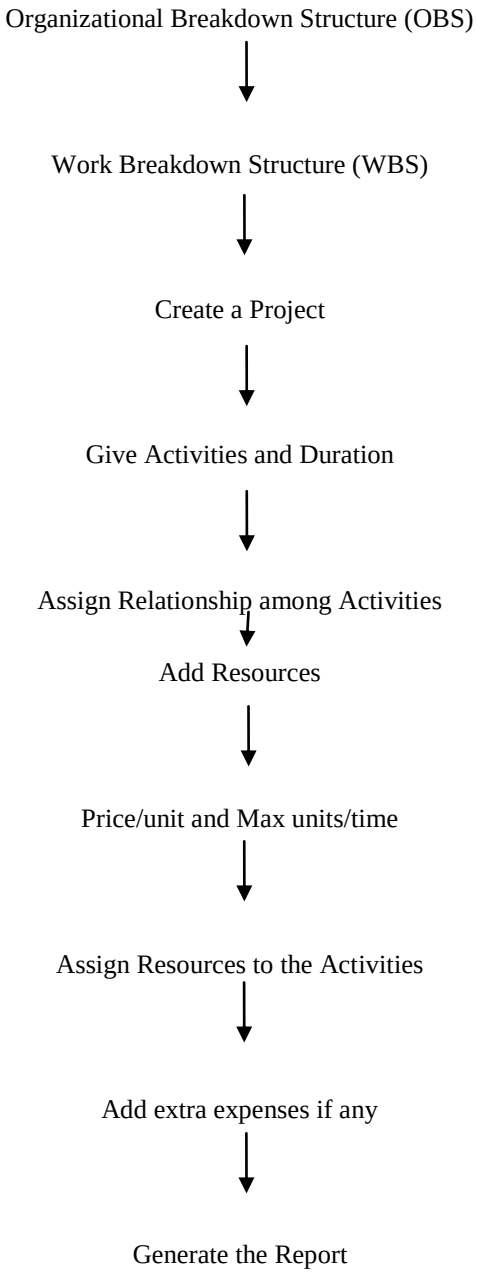
3.1 Benefits

1. Plan, schedule, and control from the simpliest to the most complex projects.
2. Allocate best resources, and track progress.
3. Visualize and communicate project performance versus plan.
4. Conduct what-if analysis, and analyze alternative project plans to increase speed and efficiency of project execution.

3.2 Procedure

Enterprise Project Structure (EPS)

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346



IV. RESULTS FROM SCHEDULING

The following results are obtained after scheduling is done.

1. Total cost of the Apartment building is INR 5,44,50,398.
2. Total Time taken for the Project to complete is 753Days

4.1 Major Activities

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

According to cost and time taken

	Work done	Cost (Lakhs)	Time(Days)
1.	Flooring ----------	87	40
2.	Doors ----------	70	80
3.	Brick Wall----------	54	100
4.	Plumbing----------	41.5	120
5.	Shuttering----------	38.5	25
6.	Kitchen , corridor--------	36	60
7.	Electricity----------	33	90
8.	Plastering----------	31.5	30
9.	Windows----------	30	50
10.	False Ceiling----------	14	45

Appartments
Report Date 10-Aug-16 17:29

Project Start 01-Aug-16
Project Finish 21-Nov-18
Data Date 01-Aug-16

Time taken by Existing Structure

WBS

Activity ID	Activity Name	Original Duration	Remaining Duration	Activity % Complete	Primary Resource	Early Start	Early Finish
Appartments							
A1000	SOP	723	723	0%		01-Aug-16	21-Nov-18
Planning							
A1010	Survey	2	2	0%	R-2.Surveyor	01-Aug-16	02-Aug-16
A1030	Architect Plan	3	3	0%	R.Planning Engineer	01-Aug-16	03-Aug-16
A1020	Soil Testing	5	5	0%	R.Planning Engineer	01-Aug-16	05-Aug-16
A1040	Estimations	2	2	0%	R-1.Civil Engineer	06-Aug-16	08-Aug-16
A1050	Approval from GHMC	15	15	0%	R.Planning Engineer	09-Aug-16	25-Aug-16
A1060	Approval for Electrical Connection	5	5	0%	R.Planning Engineer	26-Aug-16	31-Aug-16
A1070	Approval for Water Connection	5	5	0%	R.Planning Engineer	26-Aug-16	31-Aug-16
Excavation							
A1080	Clearing the Site	1	1	0%	R-9.Labour	26-Aug-16	26-Aug-16
A1090	Pit Excavation	20	20	0%	R-9.Labour	27-Aug-16	19-Sep-16
A1100	Marking for Footings	1	1	0%	R-1.Civil Engineer	20-Sep-16	20-Sep-16
Construction							
A1110	Shuttering for Footings	10	10	0%	R-9.Labour	21-Sep-16	01-Oct-16
A1120	Concreting of Footings	30	30	0%	R-1.Civil Engineer	03-Oct-16	05-Nov-16
A1125	Soil Fill and Compaction	15	15	0%	R-9.Labour	07-Nov-16	23-Nov-16
A1130	Shuttering for Columns and Beams	8	8	0%	R-9.Labour	24-Nov-16	02-Dec-16
A1140	Concreting of Columns and Beams	20	20	0%	R-1.Civil Engineer	03-Dec-16	26-Dec-16
A1150	Stair Case	15	15	0%	R-1.Civil Engineer	27-Dec-16	12-Jan-17

Page 1 of 3

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Appartments
Report Date 10-Aug-16 17:29

Project Start 01-Aug-16
Project Finish 21-Nov-18
Data Date 01-Aug-16

Time taken by Existing Structure

WBS

Activity ID	Activity Name	Original Duration	Remaining Duration	Activity % Complete	Primary Resource	Early Start	Early Finish
A1160	Shuttering of Slab and Laying Electrical Pipes	7	7	0%	R-9.Labour	13-Jan-17	20-Jan-17
A1170	Concreting the Slab	7	7	0%	R-1.Civil Engineer	21-Jan-17	28-Jan-17
A1180	Construction of Brick Walls	70	70	0%		30-Jan-17	20-Apr-17
A1200	Lintels over Openings	2	2	0%		21-Apr-17	22-Apr-17
A1190	Plastering of Walls	30	30	0%		21-Apr-17	25-May-17
A1210	Lift1	30	30	0%		24-Apr-17	27-May-17
A1215	Lift2	30	30	0%		24-Apr-17	27-May-17
A1220	False Ceiling	45	45	0%		26-May-17	17-Jul-17
A1250	Flooring in Corridor and Stair Case	20	20	0%	R-9.Labour	18-Jul-17	09-Aug-17
A1240	Laying Tiles in Kitchen and Bathroom	30	30	0%		18-Jul-17	21-Aug-17
A1230	Flooring	50	50	0%		18-Jul-17	13-Sep-17
A1255	Flooring in Parking and Cellar	20	20	0%	R-9.Labour	10-Aug-17	01-Sep-17
Electrical							
A1260	Marking for Laying Concealed Conduit Pipes in Walls	90	90	0%		22-Aug-17	04-Dec-17
A1270	Chipping the Wall and Concealing Electrical Pipes	90	90	0%		22-Aug-17	04-Dec-17
A1280	Wiring and DB Installations	90	90	0%		22-Aug-17	04-Dec-17
A1290	Giving Connections and Fixing Switch Boards	90	90	0%		22-Aug-17	04-Dec-17
Sanitation							
A1320	Installation of Water Tank	30	30	0%		05-Dec-17	08-Jan-18
A1300	Concealing Water Pipes	90	90	0%		05-Dec-17	19-Mar-18
A1310	Running Mian Water Pipeline from Tank	90	90	0%		05-Dec-17	19-Mar-18

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Appartments
Report Date 10-Aug-16 17:29

Project Start 01-Aug-16
Project Finish 21-Nov-18
Data Date 01-Aug-16

Time taken by Existing Structure

WBS / Activity ID	Activity Name	Original Duration	Remaining Duration	Activity % Complete	Primary Resource	Early Start	Early Finish
A1330	Laying Drain lines	90	90	0%		05-Dec-17	19-Mar-18
A1340	Fixing Taps and Other Fixtures	90	90	0%		09-Jan-18	23-Apr-18
Carpentry							
A1350	Fixing Door Frame	40	40	0%		24-Apr-18	08-Jun-18
A1360	Fixing Door Shutter	30	30	0%		09-Jun-18	13-Jul-18
A1370	Fixing Windows	50	50	0%		09-Jun-18	06-Aug-18
Painting							
A1380	Texture	10	10	0%		07-Aug-18	17-Aug-18
A1390	Putty	12	12	0%		18-Aug-18	31-Aug-18
A1400	Weather Shield	10	10	0%		01-Sep-18	12-Sep-18
A1410	Lappum	20	20	0%		13-Sep-18	05-Oct-18
A1420	Plastic Emulsion	20	20	0%		06-Oct-18	29-Oct-18
A1430	Wood Enamil	10	10	0%		30-Oct-18	09-Nov-18
A1440	Door Polish	10	10	0%		10-Nov-18	21-Nov-18
A1450	EOP	0	0	0%			21-Nov-18
Total		**723**	**723**			**01-Aug-16**	**21-Nov-18**

Page 3 of 3

Appartments

10-Aug-16 17:23

Cost for existing activities

Activity ID	Activity Name	Start	Finish	Budgeted Total Cost	Budgeted Total Cost
A1000	SOP	01-Aug-16	21-Nov-18	Rs0.00	Rs0.00
A1010	Survey	01-Aug-16	02-Aug-16	Rs1,600.00	Rs1,600.00
A1020	Soil Testing	01-Aug-16	05-Aug-16	Rs8,000.00	Rs8,000.00
A1030	Architect Plan	01-Aug-16	03-Aug-16	Rs4,800.00	Rs4,800.00
A1040	Estimations	06-Aug-16	08-Aug-16	Rs1,600.00	Rs1,600.00
A1050	Approval from GHMC	09-Aug-16	25-Aug-16	Rs50,800.01	Rs50,800.01
A1060	Approval for Electrical Connection	26-Aug-16	31-Aug-16	Rs800.00	Rs800.00
A1070	Approval for Water Connection	26-Aug-16	31-Aug-16	Rs800.00	Rs800.00
A1080	Clearing the Site	26-Aug-16	26-Aug-16	Rs102,000.00	Rs102,000.00
A1090	Pit Excavation	27-Aug-16	19-Sep-16	Rs338,000.00	Rs338,000.00
A1100	Marking for Footings	20-Sep-16	20-Sep-16	Rs2,300.00	Rs2,300.00
A1110	Shuttering for Footings	21-Sep-16	01-Oct-16	Rs79,000.00	Rs79,000.00
A1120	Concreting of Footings	03-Oct-16	05-Nov-16	Rs190,000.00	Rs190,000.00
A1125	Soil Fill and Compaction	07-Nov-16	23-Nov-16	Rs21,500.00	Rs21,500.00
A1130	Shuttering for Columns and Beams	24-Nov-16	02-Dec-16	Rs406,400.00	Rs406,400.00
A1140	Concreting of Columns and Beams	03-Dec-16	26-Dec-16	Rs368,250.00	Rs368,250.00
A1150	Stair Case	27-Dec-16	12-Jan-17	Rs220,850.00	Rs220,850.00
A1160	Shuttering of Slab and Laying Electrical Pipes	13-Jan-17	20-Jan-17	Rs3,347,200.00	Rs3,347,200.00
A1170	Concreting the Slab	21-Jan-17	28-Jan-17	Rs478,827.27	Rs478,827.27
A1180	Construction of Brick Walls	30-Jan-17	20-Apr-17	Rs4,500,000.00	Rs4,500,000.00

Page 1 of 3

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Appartments 10-Aug-16 17:25

Cost for existing activities

Activity ID	Activity Name	Start	Finish	Budgeted Total Cost	Budgeted Total Cost
A1190	Plastering of Walls	21-Apr-17	25-May-17	Rs2,251,000.00	Rs2,251,000.00
A1200	Lintels over Openings	21-Apr-17	22-Apr-17	Rs180,000.00	Rs180,000.00
A1210	Lift1	24-Apr-17	27-May-17	Rs900,000.00	Rs900,000.00
A1215	Lift2	24-Apr-17	27-May-17	Rs900,000.00	Rs900,000.00
A1220	False Ceiling	26-May-17	17-Jul-17	Rs1,350,000.01	Rs1,350,000.01
A1230	Flooring	18-Jul-17	13-Sep-17	Rs6,797,400.00	Rs6,797,400.00
A1240	Laying Tiles in Kitchen and Bathroom	18-Jul-17	21-Aug-17	Rs1,497,960.00	Rs1,497,960.00
A1250	Flooring in Corridor and Stair Case	18-Jul-17	09-Aug-17	Rs494,600.00	Rs494,600.00
A1255	Flooring in Parking and Cellar	10-Aug-17	01-Sep-17	Rs1,334,000.00	Rs1,334,000.00
A1260	Marking for Laying Concealed Conduit Pipes in Walls	22-Aug-17	04-Dec-17	Rs1,500.00	Rs1,500.00
A1270	Chipping the Wall and Concealing Electrical Pipes	22-Aug-17	04-Dec-17	Rs0.00	Rs0.00
A1280	Wiring and DB Installations	22-Aug-17	04-Dec-17	Rs3,375,000.00	Rs3,375,000.00
A1290	Giving Connections and Fixing Switch Boards	22-Aug-17	04-Dec-17	Rs0.00	Rs0.00
A1300	Concealing Water Pipes	05-Dec-17	19-Mar-18	Rs0.00	Rs0.00
A1310	Running Mian Water Pipeline from Tank	05-Dec-17	19-Mar-18	Rs4,050,000.00	Rs4,050,000.00
A1320	Installation of Water Tank	05-Dec-17	08-Jan-18	Rs100,000.00	Rs100,000.00
A1330	Laying Drain lines	05-Dec-17	19-Mar-18	Rs0.00	Rs0.00
A1340	Fixing Taps and Other Fixtures	09-Jan-18	23-Apr-18	Rs0.00	Rs0.00
A1350	Fixing Door Frame	24-Apr-18	08-Jun-18	Rs2,835,000.00	Rs2,835,000.00

 Page 2 of 3

V. ALTERNATIVE MATERIALS SUGGESTED

As the part of project work, alternative materials are being searched without affecting its function. All the materials are selected carefully by comparing various properties with the conventional material.

Following are the alternative materials used:

1. Clay Bricks are replaced with AAC Blocks
2. Vitrified Tiles are replaced with Marble Flooring
3. Internal Teak doors are replaced with Teak Veneer doors
4. Cement Plastering is replaced with Gypsum Plastering
5. Green Marble in Corridor is replaced with Morwad Marble
6. Marble Flooring on Stair case is replaced with Flamed Granite
7. River sand is replaced with Robo Sand

5.1 Comparison between Bricks and Blocks

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Construction of 100sq feet 6 inch wall				Rate		3400
Material	Brick Wall			Block Wall		
	Quantity	Prices/Unit	Cost	Quantity	Prices/Unit	Cost
Brick/Block	600.00	8.50	5100.00	56.00	76.51	4284.43
Mortor						
Cement(Bag)	3.38	275.00	928.13	1.28	275.00	350.63
Sand(brass)	0.15	5500.00	825.00	0.06	5500.00	330.00
Plaster						
Cement(bag)	4.00	275.00	1100.00	2.00	275.00	550.00
Sand (brass)	0.16	5500.00	880.00	0.08	5500.00	440.00
			8833.13			5955.05
				Savings(%)	32.6	

5.2 Technical Comparison

S.no	Parameter	AAC Blocks	Clay Bricks
1	Compressive Strength	3.5-4N/m^2	2.5-3 N/m^2
2	Fire Resistance(8" Wall)	Upto 7hours	Around 2hours
3	Variation in size	1.5mm(+/-)	5mm(+/-)
4	Dry density	550-700kg/m^3	1800kg/m^3
5	Energy Saving	Approximately 30% for heating and cooling	None
6	Cost Benifit	Reduction in dead weight leading to saving in steel and concrete	None

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Vitrified Tiles Are Replaced With Marble Flooring

1. Marble is a type of rock composed of recrystallized material most commonly limestone.
2. The white marble comes from the most pure form of limestone.
3. Colors and veins in the marble arise when other materials are present in the earth crust along with limestone.
4. Marble gives soft look and provides elegance to the modern era structures. Marble is a natural stone whereas Vitrified Tiles are made up of Chemical Reaction.
5. Tiles are made from porcelain, fired clay or ceramic with a glazed surface
6. Marble is highly durable and resistant to water and grease than the Tiles.

Comparision of Cement Plastering and Gypsum Plastering

Cement mortor Plastering	Gypsum Plastering
Lot of materials gets waste during mixing and application	Ensures Zero wastage
Sand cement plaster is applied within level patches, which does not ensure line & level surfaces	Gypsum plaster is applied within level strips which ensure line &level surfaces.
Water curing for 7 days minimum	No water curing is needed
Shrinkage cracks	No shrinkage Cracks
Increases thickness upto 50mm	Thickness of wall limited to 15-20mm
Need to use POP to finish,wastage is as high as 30-40%	Direct application on Brick ,Block or RCC,no separate finishing product is required.
Attains full strength after 28days	Ready to paint
Compressive strength =1783N/m^2	Compressive strength =2175N/m^2
Not a green material , cement releases CO_2	Environmentally Green

VI. MARBLE FLOORING ON STAIR CASE IS REPLACED WITH FLAMED GRANITE

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

1. Marble flooring on Stair case is not suggestible even though less number of polish coatings is made, as it has a tendency to skid.
2. Flamed granite is a material made from Granite which has rough surface and gives greater grip when we step on it.
3. Granite is a light-colored igneous rock with grains large enough to be visible with the unaided eye.
4. Granite flaming is the application of high temperature to the surface of stone to make it look like natural weathering, which makes its surface to become rough.
5. This causes the crystals to pop and results in a highly textured and rough surface with zero shine

6.1 River Sand is Replaced with Robo Sand

1. River sand is the most traditionally used construction material in Slab, Columns, Beams and also in Wall Plastering.
2. It is a material which is available near River beds, which is completely depleting now a days leading to environmental imbalance.
3. Also river sand became too costly about INR 2000/Ton, which indirectly leading to increase in Construction Cost.
4. So there is an immediate need to search an alternative material i.e., *ROBO SAND*
5. ROBOSAND is sand manufactured, obtained from specific natural granite using the state of the art
6. European technology.
7. Its numerous advantages over river sand have made it a favorite and a "Must- to- use" with quality conscious builders.
8. The compressive strength of the concrete made of Robo sand is observed to be the same to the strength of the concrete.

6.2 Test Results

Test on concrete making material with ROBO SAND and RIVER SAND as ingredients cement (As per IS 4031-1988)

	RIVER SAND	**ROBO SAND**
3 days compressive strength	33.0Mpa	33.0Mpa
3 days compressive strength	39.0Mpa	39.0Mpa
3 days compressive strength	49.0Mpa	49.0Mpa
Setting time initial	190 min	190 min
final	290 min	290 min
Fineness(‘s)	308 sq.m/Kg	308 sq.m/Kg

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Appartments

VE MATERIALS APPLIED COMPARISION WITH BL

Activity ID	Activity Name	Original Duration	BL Project Duration	Budgeted Total Cost	BL Project Total Cost
A1000	SOP	723	753	Rs0.00	Rs0.00
A1010	Survey	2	2	Rs1,600.00	Rs1,600.00
A1020	Soil Testing	5	5	Rs8,000.00	Rs8,000.00
A1030	Architect Plan	3	3	Rs4,800.00	Rs4,800.00
A1040	Estimations	2	2	Rs1,600.00	Rs1,600.00
A1050	Approval from GHMC	15	15	Rs50,600.01	Rs50,600.01
A1060	Approval for Electrical Connection	5	5	Rs800.00	Rs800.00
A1070	Approval for Water Connection	5	5	Rs800.00	Rs800.00
A1080	Clearing the Site	1	1	Rs102,000.00	Rs102,000.00
A1090	Pit Excavation	20	20	Rs338,000.00	Rs338,000.00
A1100	Marking for Footings	1	1	Rs2,300.00	Rs2,300.00
A1110	Shuttering for Footings	10	10	Rs79,000.00	Rs79,000.00
A1120	Concreting of Footings	30	30	Rs190,000.00	Rs199,000.00
A1125	Soil Fill and Compaction	15	15	Rs21,500.00	Rs21,500.00
A1130	Shuttering for Columns and Beams	8	8	Rs406,400.00	Rs406,400.00
A1140	Concreting of Columns and Beams	20	20	Rs368,250.00	Rs395,250.00
A1150	Stair Case	15	15	Rs220,850.00	Rs220,850.00
A1160	Shuttering of Slab and Laying Electrical Pipes	7	7	Rs3,347,200.00	Rs3,347,200.00
A1170	Concreting the Slab	7	7	Rs478,827.27	Rs478,827.27
A1180	Construction of Brick Walls	70	100	Rs4,500,000.00	Rs5,400,000.00

Appartments

VE MATERIALS APPLIED COMPARISION WITH BL

Activity ID	Activity Name	Original Duration	BL Project Duration	Budgeted Total Cost	BL Project Total Cost
A1190	Plastering of Walls	30	30	Rs2,251,000.00	Rs3,151,000.00
A1200	Lintels over Openings	2	2	Rs180,000.00	Rs180,000.00
A1210	Lift1	30	30	Rs900,000.00	Rs900,000.00
A1215	Lift2	30	30	Rs900,000.00	Rs900,000.00
A1220	False Ceiling	45	45	Rs1,350,000.01	Rs1,350,000.01
A1230	Flooring	50	40	Rs6,797,400.00	Rs8,669,227.28
A1240	Laying Tiles in Kitchen and Bathroom	30	30	Rs1,497,960.00	Rs1,497,960.00
A1250	Flooring in Corridor and Stair Case	20	30	Rs494,600.00	Rs719,200.00
A1255	Flooring in Parking and Cellar	20	20	Rs1,334,000.00	Rs1,334,000.00
A1260	Marking for Laying Concealed Conduit Pipes in Walls	90	90	Rs1,500.00	Rs1,500.00
A1270	Chipping the Wall and Concealing Electrical Pipes	90	90	Rs0.00	Rs0.00
A1280	Wiring and DB Installations	90	90	Rs3,375,000.00	Rs3,375,000.00
A1290	Giving Connections and Fixing Switch Boards	90	90	Rs0.00	Rs0.00
A1300	Concealing Water Pipes	90	90	Rs0.00	Rs0.00
A1310	Running Main Water Pipeline from Tank	90	90	Rs4,050,000.00	Rs4,050,000.00
A1320	Installation of Water Tank	30	30	Rs100,000.00	Rs100,000.00
A1330	Laying Drain lines	90	90	Rs0.00	Rs0.00
A1340	Fixing Taps and Other Fixtures	90	90	Rs0.00	Rs0.00
A1350	Fixing Door Frame	40	40	Rs2,835,000.00	Rs2,835,000.00

International Journal of Advance Research in Science and Engineering
Vol. No.5, Issue No. 10 , October 2016
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

Appartments

VE MATERIALS APPLIED COMPARISION WITH BL

Activity ID	Activity Name	Original Duration	BL Project Duration	Budgeted Total Cost	BL Project Total Cost
A1360	Fixing Door Shutter	30	40	Rs3,150,000.00	Rs5,850,000.00
A1370	Fixing Windows	50	50	Rs3,060,000.00	Rs3,060,000.00
A1380	Texture	10	10	Rs59,400.00	Rs59,400.00
A1390	Putty	12	12	Rs793,920.00	Rs793,920.00
A1400	Weather Shield	10	10	Rs660,870.00	Rs660,870.00
A1410	Lappum	20	20	Rs2,170,000.00	Rs2,170,000.00
A1420	Plastic Emulsion	20	20	Rs1,240,000.00	Rs1,240,000.00
A1430	Wood Enamil	10	10	Rs344,000.00	Rs344,000.00
A1440	Door Polish	10	10	Rs150,594.00	Rs150,594.00
A1450	EOP	0	0	Rs0.00	Rs0.00
Total		723	753	Rs47,817,971.29	Rs54,450,398.57

© Oracle Corporation Page 3 of 3

VII.CONCLUSIONS

1. Cheaper alternative materials are available in the market which satisfies the functions and requirements of the work.
2. With ages the construction sector should witness number of new trends, technology advancements.
3. Reducing the cost of construction is only possible when new materials are being invited and accepted in construction.
4. People thinking must change to accept the change in construction materials, ultimately leading to cut down the increasing construction costs without compromising in quality leading to increase in the VALUE of construction**.**

REFERENCES

[1] A. Ismail, R Aminzadeh, A. Aram and I.Arshad. (2010)"Using of value engineering in main road construction". Journal of applied science, ISSN-1812-5654. 10(22) 2950-2953, Malaysia.

[2] S. Kemmochi, A. Koizumi, A study on the application of value engineering to the construction industry, Journal of Japan Society of Civil Engineers, Ser. F4 (Construction and Management) 68 (1) (2012) 28-39.

[3] A. Palmer, J. Kelly, S. Male, Holistic appraisal of value engineering in construction in United States, Journal of Construction Engineering and Management 122 (4) (1996)324-328.

[4] A. Amizadeh, R. Arshad. (2011)"Using of value engineering in building construction". Journal of applied science

[5] Lawrence D. Miles, Techniques of Value Analysis and Engineering, McGraw-Hill Book Company, 2009.

[6] Value Standard and Body of Knowledge SAVE International, The Value Society, Northbrook, IL, USA,June 2007, p. 12.

[7] V.N.Heggade. "IT-propelled value engineering in construction", The Indian Concrete Journal, April 2002.