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Estimation & Costing of Residential Building using Conventional Method vs HIT- Office Software

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Abstract: Construction industry is considered an important sector for the development. Cost estimation process is an important element of the construction industry. Early decades cost estimate plays significant role in the success of any construction project. This research aims to predict the parametric cost estimation in construction building projects. This research has been conducted through literature reviews of the cost estimating process, followed by a survey done in order to define the building factors which is effected to calculate estimation conventionally and by using ERP Software. The Objective of this paper is to analyze the effectiveness of various cost estimation methods by comparing Traditional and HIT Office software method to do quantity take offs through a case study in Pune. This study will provide more accurate estimates, save time, minimize error, and hopefully to have better chance to win bids.

Keywords: Quantity Takeoff, HIT-Office, Spread sheets

I. INTRODUCTION

At the beginning of the project by the owner, prior to any design, only limited information known about a project. However, before taking any type of work for its execution, the owner or builder should have a through knowledge about the volume of work that can be completed within the limits of this funds or the probable cost that may be required to complete the proposed work from its plan and specification, otherwise it may so happen that the work has to be stopped before its completion due to the shortage of funds or materials. Besides the above an estimate for any public construction work is required to be prepared and submitted beforehand so that sanction of necessary funds may be obtained from the authority concerned.

Thus an estimate for any construction work may be defined as the process of calculating the quantities, and costs of the various items required to connection with the project and multiplied by unit cost of item concerned. To prepare an estimate, drawings consisting of the plan, the elevation and the sections through important points, along with a detailed specification giving specific description of all workmanship, properties and proportion of materials are required.

II. OBJECTIVES

- A. To study different techniques of estimation and costing for residential building.
- B. Selection of case study for the project.
- C. Quantity and Cost Estimation by using Software and Conventional Method.
- D. Comparison (analysis) between two techniques for estimation and costing.
- E. To find out the Suitable & Flexible software for the customer.

III. DESCRIPTION STUDY AREA:-

In this paper, the author has selected a Residential Building (G+13) near Pune, to take up this study of comparing the take-off quantities by using HIT-OFFICE software and by Traditional method. This project is located in Yewalewadi in Katraj-Kondhwa which is one of the fast-developing areas around Pune. The total area of the proposed layout is about 7 acres (Mini-Township) in which we have taken 1 wing (D) having 80 Flats in one wing with all the amenities and facilities such as water supply, drainage system, parks, community hall, shopping – centers, etc.

As per the methodology explained in this paper, the author has selected a case study of Residential Building near Pune to take up, this study of comparing the take-off quantities by using HIT-OFFICE Software and by Traditional method. Initially the Bill of Quantities and cost estimates of this entire Building were calculated using by software & by using traditional method & by employing Microsoft Excel Spread sheets. Using the traditional method, the author of this paper arrived at the cost estimate by taking take off for all structural elements including beams, columns, foundations, slabs, excavations, earth works, concrete works, steel works, etc.

IV. METHODOLOGY

A. Initiation

- 1) Select a site (Case Study i.e. G+13)
- 2) Collecting Info Regarding site
- 3) To study about literatures
- 4) Find Problem Statement

B. Planning

- 1) Investigation on problem Statement
- 2) Assigning Work For Team Members
- 3) Estimation Of Building
- 4) Review on Conventional Estimation

C. Implementation

- 1) Learning ERP Software
- 2) Total Estimation Of Building By Software
- 3) Review on Estimation By Software

D. Closure

- 1) Review Completion
- 2) Comparison Between Two Techniques
- 3) Result
- 4) Project Closure

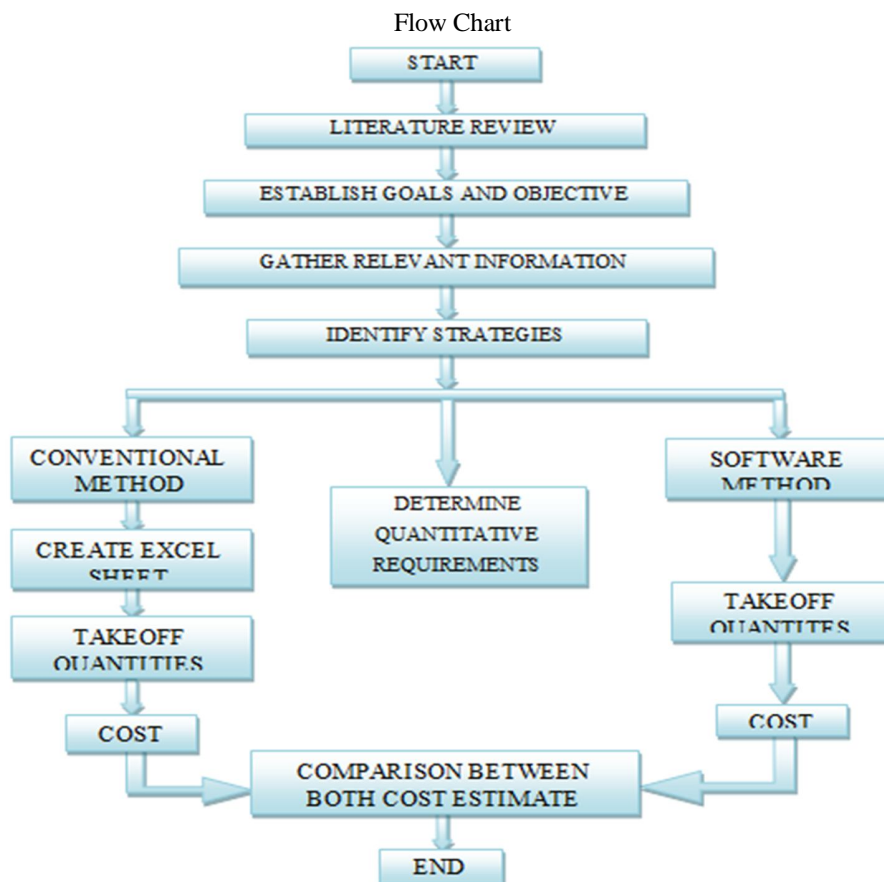


Figure 1: Represents The Flow Chart Of Detailed Methodology

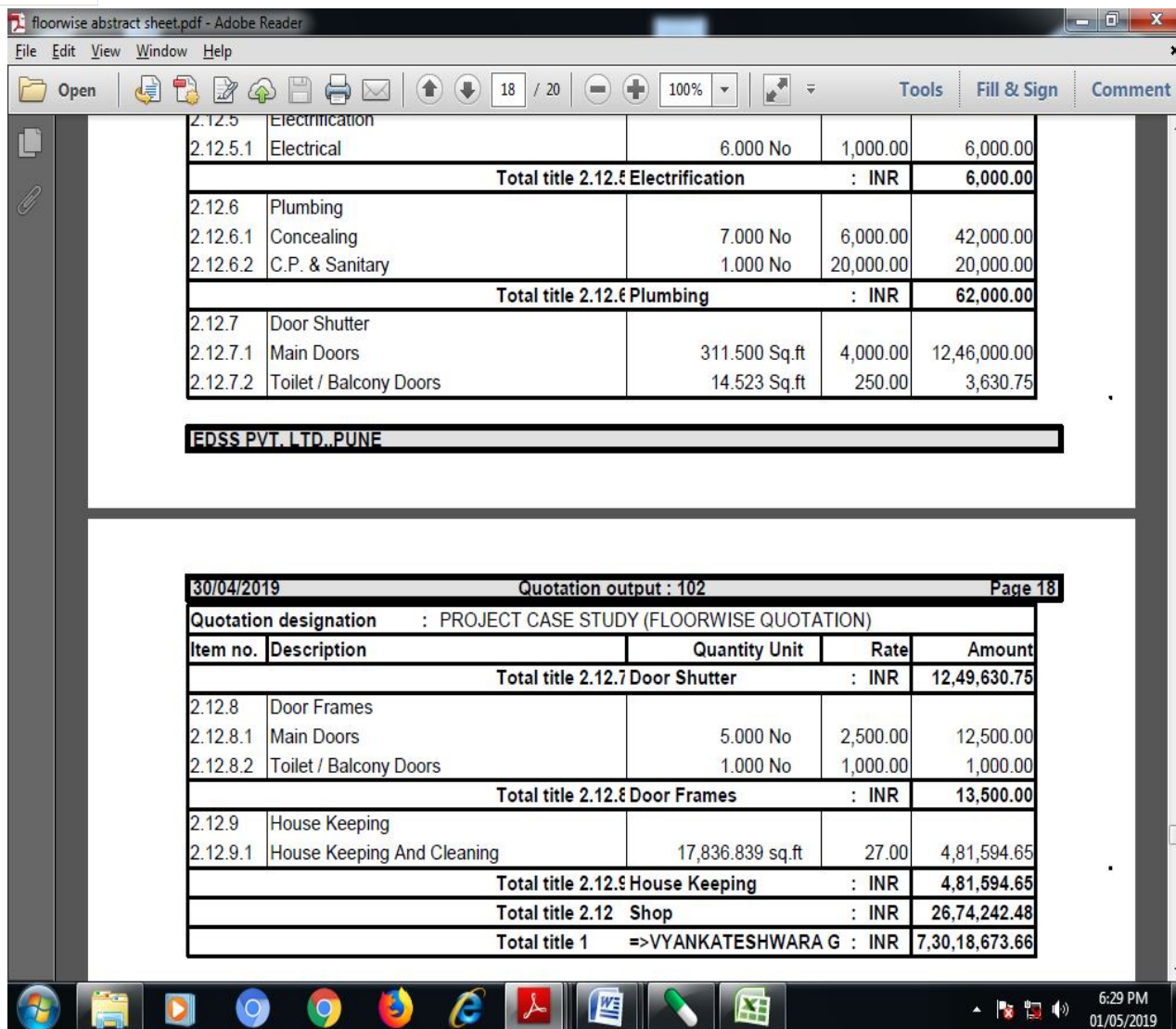
V. RESULTS AND DISCUSSIONS

After the entire take offs were taken, a Microsoft excel spreadsheet formula has been developed to calculate the final cost estimate by inputting the quantities and individual unit cost prices. A spread sheet used by the author for quantity take offs of total building is shown below Figure 2 to give an idea to the readers.

15	Door frame						
a	Main Doors	73.00	Nos	1600	116800	0.15996	
b	Bedroom doors	71.00	Nos	1200	85200	0.11668	
c	Toilet Doors /Balcony Doors	177.00	Nos	1000	177000	0.24240	
16	Railing	1119.40	Rft	700	783580	1.07312	
17	Electrical						
a	Internal	72.00	Nos	21000	1512000	2.01070	
b	Lobby	36.00	Nos	1000	36000	0.4930	
18	Plumbing						
a	Concealing	71.00	Nos	6000	426000	0.58341	
b	C.P. & Sanitary	71.00	Nos	20000	1420000	1.94471	
19	Paint						
a	Internal paint	126355.03	Sqft	15	1895325.48	2.59567	
b	External paint	64389.66	Sqft	15	965844.84	1.32274	
20	House keeping & Cleaning	49459.05	Sqft	27	1335394.35	1.82884	ERP Software Estimated Amount = 73018672.9797
					55890785.16	76.54314	
					Excel Total Amount	72958733.33507	
					Difference due to human error	59939.64460	

Figure 2: Represents The Final Cost Of The Project In Excel Sheet

Showing quantity takeoff calculated for Building using spread sheet. in the traditional method of cost estimation, an estimator tries to do the quantity take-off by calculating areas, volumes, no. of all building elements such as beams, columns, walls, etc.



Item no.	Description	Quantity Unit	Rate	Amount
2.12.5	Electrification			
2.12.5.1	Electrical	6,000 No	1,000.00	6,000.00
Total title 2.12.5 Electrification				: INR 6,000.00
2.12.6	Plumbing			
2.12.6.1	Concealing	7,000 No	6,000.00	42,000.00
2.12.6.2	C.P. & Sanitary	1,000 No	20,000.00	20,000.00
Total title 2.12.6 Plumbing				: INR 62,000.00
2.12.7	Door Shutter			
2.12.7.1	Main Doors	311.500 Sq.ft	4,000.00	12,46,000.00
2.12.7.2	Toilet / Balcony Doors	14.523 Sq.ft	250.00	3,630.75
Total title 2.12.7 Door Shutter				: INR 12,49,630.75
2.12.8	Door Frames			
2.12.8.1	Main Doors	5,000 No	2,500.00	12,500.00
2.12.8.2	Toilet / Balcony Doors	1,000 No	1,000.00	1,000.00
Total title 2.12.8 Door Frames				: INR 13,500.00
2.12.9	House Keeping			
2.12.9.1	House Keeping And Cleaning	17,836.839 sq.ft	27.00	4,81,594.65
Total title 2.12.9 House Keeping				: INR 4,81,594.65
Total title 2.12 Shop				: INR 26,74,242.48
Total title 1 =>VYANKATESHWARA G				: INR 7,30,18,673.66

Figure 3: Represents The Final Cost Of The Project In Software

Showing the method proposed by the author, a software named HIT-OFFICE is used to do the quantity take offs. The author was able to take quantity take-off for Residential Building, all the works are related to the estimation are calculated in the HIT-Office Software.

VI. CONCLUSION

From this Research we conclude that, the appropriate software and method for cost estimation, which helps to reduce initial investment. HIT-Office Software is more precise than comparing with MS Excel. The benefits of using HIT-Office Software for quantity estimation are, a lot of time could be saved on computing quantity take offs by employing HIT-Office than using traditional excel spread sheets.

Excel is more flexible (customization are available) than the software, but flexibility comes with the accumulation of errors. While performing, human errors may takes place & we need to assign logical formulas for each cell. The result obtained is nearly accurate comparable to the result obtained from traditional method. Adopting this software for computing quantity takeoffs could significantly reduce the efforts of construction estimator. By reducing the major work of estimator, various risks that may occur in the project could also be foreseen.



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