# STAGE WISE COMPARISION OF ESTIMATION OF G+4 UNDER CONSTRUCTION RCC BUILDING

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***Abstract :*** Cost is probably the first to be consider when it comes to construction project .It is the monetary valuation of effort,material, resources, time consumed and delivery of good or survives. Accurate estimation quantities and cost incurred .in a construction project is a crucial factor in its achievement. In this study report .We have done the literature survey , by that we have found out that the most work done on the cost estimation of building but no one done research on the cost minimization of RCC building. Cost is managed but cost estimation system .We have tried to do research on the different models used for estimation. We have tried to do cost minimization by comparing the actual cost of running construction RCC building with the analytically calculated cost of that building which is done manually. We took the RCC building for accurate values. In this report we also study about the cost comparison which is beneficial or not for the cost management and cost minimization of RCC building .In this slightly we tried various methods for estimation of cost calculation.

***IndexTerms*** **- RCC, Building, Estimation, Cost, Construction Cost.**

## I. INTRODUCTION

our study we do the calculation of cost we help of several method analysis the structure calculate its estimate .We have done comparison between the actual cost of building calculated cost of the building , which construction was running . We chose multistory building for our study. The work of the structure undergoing therefore we used stage wise comparison. We thought, it's important to know that cost minimization can be possible by proper planning. In our study stage wise comparison done for checking whether cost minimization possible or not .but we used the method which are basically used for calculating estimate, and studied theoretically so it is limited to give as some margin of error it was basically trial and error method to check the estimate .we also used various method like rate analysis and bar bending schedule etc. we have consumed that this comparison could give the difference in actual cost and calculated cost, by which we can acknowledge that in which stage. We required proper cost management .we also assume that calculate cost will give as benefit lees value.

## II. LITERATURE REVIEW

Sae-Hyun Ji,JosephAhn, Hyun-Soo Lee and Kyeongjin(2019) done the suggested cost model outperforms a typical CBR cost model and identified the modified parameter-making process, which integrates many influential factors into a small number of significant parameters and has a positive impact on the performance of the cost model. Also estimates the cost using quantity-based modified parameters multiplied by their price, so the cost model can actively respond to the iterative requirements of recalculation of the cost.

An The Hoai Le, NilukaDomingn (2018) They have worked for the building maintenance as it is considered as a main activity in the construction industry, as it is essential whether the building are large or small, simple or complex. They have used EU standard 2009.

Punam Bhimrao kotake (2018) The system of cost estimation and cost control for the building during design and development. Research s to calculate the preconstruction cost of residential building by elemental method and the calculation of quantity for construction of building by using Microsoft Excel with the help of AutoCAD drawing.

Appu John, AswathyWarrier(2018) They have worked on building construction in which the work and quantity of items calculated by simple mensuration method and also using two methods long wall short wall and centre line method and estimation of building having wall with similar cross section.

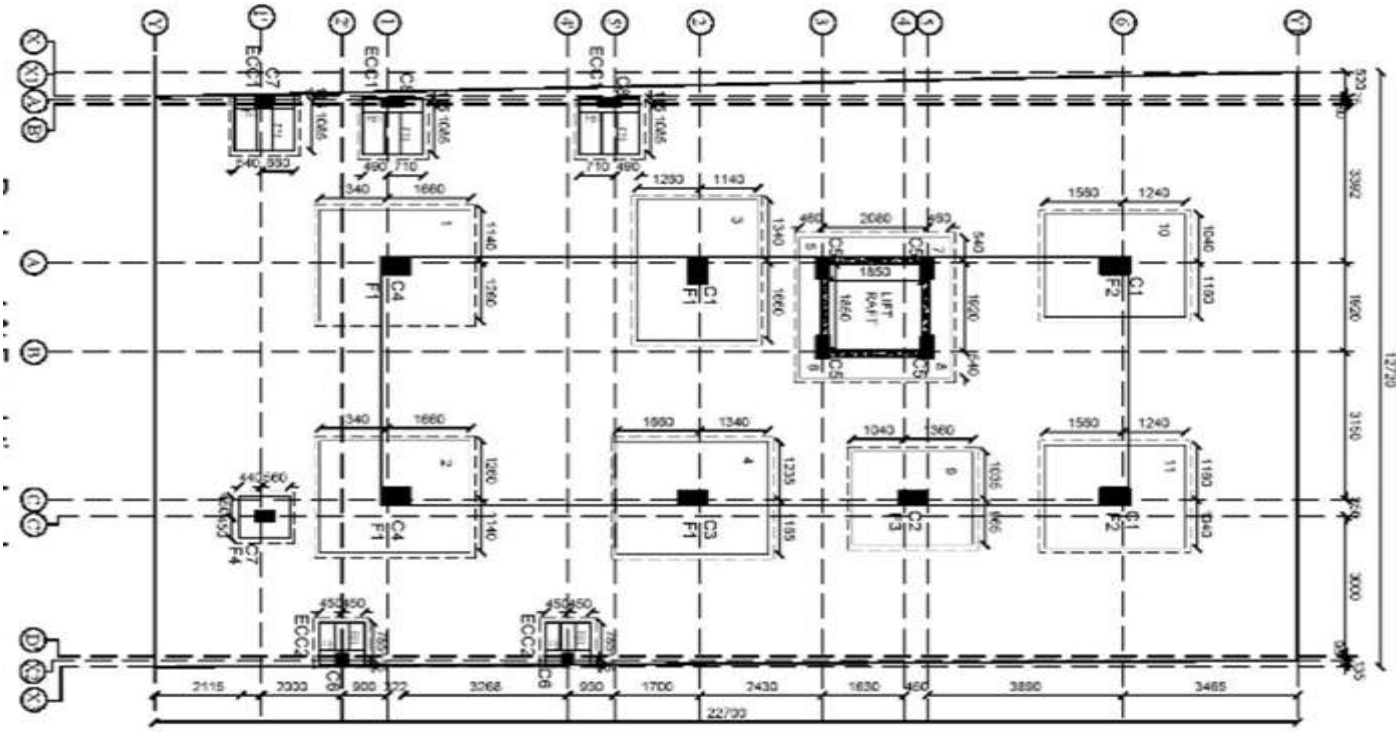
Cláudio Ricardo Bettini, Orlando Celso Longo, Luciane Ferreira Alcoforado, Alana Caroline Gamba Maia (2016) have worked on different methods used for the estimation of the construction cost and as a last observation it could be said that neural networks seem to have a great potential to improve this work, turning the estimation process at the same time quicker, more reliable and even more precise.

SenemBilir And G. EmreGurucanli(2015)This paper made an effort to estimate OHS(cost of occupational health and safety)cost before construction starts.This study tries to provide an approach.Especially for prime contractors to estimate OHS cost construction can prefer safety plans and organisation and required budget to safety measure not only for cost control but also have human life is protected.

Abdelrahman Osman Elfaki,SalehAlatawi and EyadAbushandi (2014) have found that there is crucial necessity for a cost estimation method that covers all estimation factors from both types and real need for a standard validation method which can be used to determine the accuracy level of a cost estimation proposal.

Neven Martinec, NevenaHrnjakAjukovic, StjepanBezak (2009) the paper is based on the previous experience constructed buildings. Compairing on bills and quantities for the respective buildings, they discovered the differences in the number, description, and type and execution technology of buildings.

## III. METHODOLOGY AND CALCULATION



| COLUMN TYPE | COLUMN AT BELOW PLINTH LEVEL | | | | COLUMN AT ABOVE PLINTH TO 1ST SLAB LEVEL | | | |
|---|---|---|---|---|---|---|---|---|
| | SIZE OF COLUMN | MAIN BARS IN COLUMN | LINKS C/C NEAR SUPPORT | LINKS C/C AT MIDDLE | SIZE OF COLUMN | MAIN BARS IN COLUMN | LINKS C/C NEAR SUPPORT | LINKS C/C AT MIDDLE |
| C1 | 400 x 600 | 12 x 16ϕ | 8ϕ100 MM C/C 4 legged | 8ϕ150 MM C/C 4 legged | 350 x 550 | 12 x 16ϕ | 8ϕ@100 4 legged | 8ϕ@150 4 legged |
| C2 | 350 x 600 | 12 x 12ϕ | 8ϕ100 MM C/C 4 legged | 8ϕ150 MM C/C 4 legged | 300 x 550 | 12 x 12ϕ | 8ϕ@100 4 legged | 8ϕ@150 4 legged |
| C3 | 350 x 600 | 14 x 16ϕ | 8ϕ100 MM C/C 4 legged | 8ϕ150 MM C/C 4 legged | 300 x 550 | 14 x 16ϕ | 8ϕ@100 4 legged | 8ϕ@150 4 legged |
| C4 | 400 x 600 | 6 x 16ϕ 6 x 20ϕ | 8ϕ100 MM C/C 4 legged | 8ϕ150 MM C/C 4 legged | 350 x 550 | 6 x 16ϕ 6 x 20ϕ | 8ϕ@100 4 legged | 8ϕ@150 4 legged |
| C5 | 280 x 500 | 8 x 12ϕ | 8ϕ100 MM C/C 4 legged | 8ϕ150 MM C/C 4 legged | 230 x 450 | 8 x 12ϕ | 8ϕ@100 4 legged | 8ϕ@150 4 legged |
| C6 | 280 x 280 | 4 x 12ϕ | 8ϕ100 MM C/C | 8ϕ150 MM C/C | 230 x 230 | 4 x 12ϕ | 8ϕ@100 | 8ϕ@150 |
| C7 | 280 x 400 | 6 x 12ϕ | 8ϕ100 MM C/C | 8ϕ150 MM C/C | 230 x 350 | 6 x 12ϕ | 8ϕ@100 | 8ϕ@150 |
| C8 | 200 x 500 | 8 x 12ϕ | 8ϕ100 MM C/C 4 legged | 8ϕ150 MM C/C 4 legged | 150 x 450 | 8 x 12ϕ | 8ϕ@100 4 legged | 8ϕ@150 4 legged |

SCHEDULE OF COLUMN FOOTINGS.(M-20 / Fe- 500)

| FOOTING GROUP | EXCAVATION SIZE ( BxL ) | PCC. THK. | FOOTING DETAILS SIZE (B1xL1) | DEPTH D | DEPTH d | BOT. STEEL ALONG LONG DIR c/c | BOT.STEEL ALONG SHORT DIR c/c | REMARKS |
|---|---|---|---|---|---|---|---|---|
| F1 | 2600 x 3200 | 100 | 2400 x 3000 | 550 | 550 | 10ϕ @ 120 mm C/C | 10ϕ @ 120 mm C/C | BOX FOOTING |
| F2 | 2400 x 3000 | 100 | 2200 x 2800 | 500 | 500 | 10ϕ @ 130 mm C/C | 10ϕ @ 130 mm C/C | BOX FOOTING |
| F3 | 2200 x 2600 | 100 | 2000 x 2400 | 450 | 450 | 10ϕ @ 140 mm C/C | 10ϕ @ 140 mm C/C | BOX FOOTING |
| F4 | 1100 x 1200 | 100 | 900 x 1000 | 375 | 375 | 10ϕ @ 140 mm C/C | 10ϕ @ 140 mm C/C | BOX FOOTING |
| ECC1 | 1300 x 1400 | 100 | 1200 x 1200 | 375 | 375 | 10ϕ @ 130 mm C/C | 10ϕ @ 130 mm C/C | BOX FOOTING |
| ECC2 | 1000 x 1100 | 100 | 900 x 900 | 375 | 375 | 10ϕ @ 140 mm C/C | 10ϕ @ 140 mm C/C | BOX FOOTING |
| LIFT RAFT | 3200 x 3200 | 100 | 3000 x 3000 | 450 | 450 | 10ϕ @ 120 mm C/C TOP & BOTTOM MESH | 10ϕ @ 120 mm C/C TOP & BOTTOM MESH | BOX FOOTING |

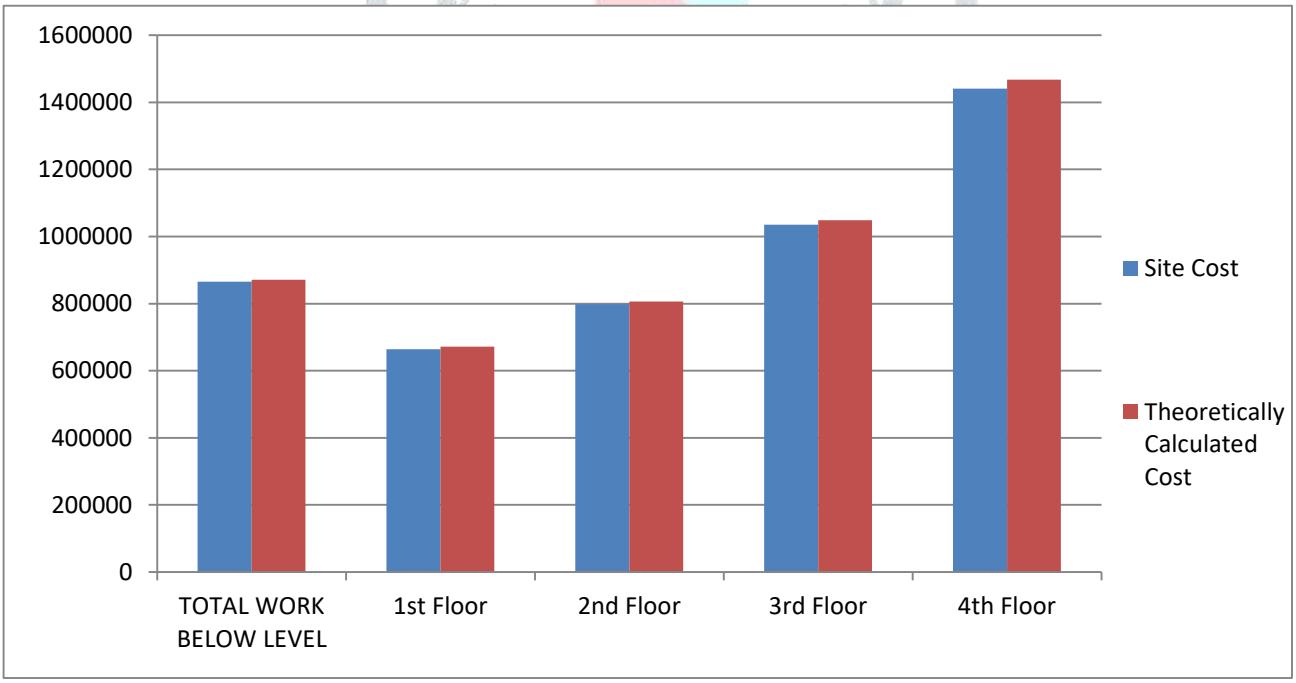
At the site and for theoretical calculation, we have used centre line method for cost estimation.

Sample calculation:-
1 $m^3$ = 35.3147 $ft^3$
All calculation in M (meter).

| S.N. | FOOTING GROUP | EXCAVATION SIZE | CALCULATION | EXCAVATION | BACKFILL |
|---|---|---|---|---|---|
| 1. | F1 | 2.6 X 3.2 X 1.5 | 2.6 X 3.2 X 1.5 = 12.48 $m^3$ | | |
| | | | 12.48 X 4 = 49.92 $m^3$ | 49.22 $m^3$ | 16.47 $m^3$ |
| 2. | F2 | 2.4 X 3 X 1.5 | 2.4 X 3 X 1.5 = 10.80 $m^3$ | | |
| | | | 10.80 X 2 = 21.60$m^3$ | 21.60 $m^3$ | 7.12 $m^3$ |
| 3. | F3 | 2.2 X 2.6 X 1.5 | 2.2 X 2.6 X 1.5 = 8.58$m^3$ | 8.58 $m^3$ | 2.82 $m^3$ |
| 4. | F4 | 1.1 X 1.2 X 1.5 | 1.1 X 1.2 X 1.5 = 1.97$m^3$ | 1.97 $m^3$ | 0.65 $m^3$ |
| 5. | ECC1 | 1.3 X 1.4 X 1.5 | 1.3 X 1.4 X 1.5 = 2.34 $m^3$ | | |
| | | | 2.34 X 2 = 4.68$m^3$ | 4.68 $m^3$ | 1.80 $m^3$ |
| 6. | ECC2 | 1 X 1.1 X 1.5 | 1 X 1.1 X 1.5 = 2.09 $m^3$ | | |
| | | | 2.09 X 2 = 4.19$m^3$ | 4.19 $m^3$ | 1.08 $m^3$ |
| 7. | LIFT RAFT | 3.2 X 3.2 X 1.5 | 3.2 X 3.2 X 1.5 = 15.36$m^3$ | 15.36 $m^3$ | 5.06 $m^3$ |
| TOTAL - | | | | 106.30 $m^3$ | 35.04 $m^3$ |

Market rate for excavation 1$m^3$ – 565/-
Market rate for back filling - 540/-
1. Total Excavation 106.30 x 565 = 60,059.5/-
2. Total Back filling 35.04 x 540 = 18,921.6/-
Total - 78,981.1/-

| PROJECT COST OF RESIDENTIAL BUILDING (G+4) | | | |
|---|---|---|---|
| SR. NO. | PARTICULAR | Site Cost | Theoretically Calculated Cost |
| 1. | TOTAL WORK BELOW LEVEL | 8,65,000/- | 8,71,592/- |
| 2. | FIRST FLOOR LEVEL | 6,64,450/- | 6,71,981/- |
| 3. | SECOND FLOOR LEVEL | 7,98,291/- | 8,06,378/- |
| 4. | THIRD FLOOR LEVEL | 10,35,000/- | 10,48,291/- |
| 5. | FOURTH FLOOR LEVEL | 14,40,650/- | 14,67,608/- |
| TOTAL PROJECT COST (In Rupees.) | | 48,03,391/- | 48,65,850/- |




## IV. RESULT AND DISCUSSION

In our study, from the result we have found that the calculated cost of the building obtained was Rs. 48,03,391 and the actual cost of building at site obtained was Rs48,65,850. There is very less difference in calculated cost and site cost for foundation ,first floor and second floor but for third and fourth floor the difference was greater. The cost could be reduced by reducing material loss, manpower management.

## V. CONCLUSION

We have concluded that the cost required for the different building work can be reduced and it can be completed in less cost. Use of certain practices can help in reduction of waste. Lower the waste, lower the cost. The major reason behind cost increase is the building material waste which generates during mixing, transportation and placing. Proper practices and time management can save Labour time and material which are the two major cost consuming elements. Use of machines instead of labour and casting multiples building members at same time can help in cost reduction.

## VI. REFERENCES


[1] SAE-HYUN JI.JOSEPHAHN, HYUN-SOO LEE AND KYEONGJIN,"COST ESTIMATION MODEL USING MODIFIED PARAMETERS FOR CONSTRUCTION PROJECT" VOLUME 2019,ARTICLE ID 8290935.

[2] ANTHIHAOI LE, NILUKA DOMINGO, EZIAKU RASHEED AND KENNETH SUNGHO PARK (SEPT 2018) "BUILDING MAINTENANCE COST PLANNING AND ESTIMATING", 34TH ANNUAL ASSOCIATION OF RESEARCHERS IN CONSTRUCTION MANAGEMENT CONFERENCE, ARCOM 2018,PAGE NO. 697-706

[3] PUNAM BHIMRAO KOKATE."COST OF PLANNING AND ESTIMATION FOR RESIDENTIAL BUILDING" IJSRT,, VOLUME 3, ISSUE 4, APRIL – 2018, ISSN NO:-2456-2165.

[4] APPU JOHN, ASWATHYWARRIER , HANNA MINI SABU, MARIAMOLMATHEW,SNEHA GEORG (FEB-2018) "ESTIMATION OF A REINFORCED BUILDING,IRJET, VOLUME: 05 ISSUE: 02 FEB-2018, E-ISSN: 2395-0056.

[5] CLÁUDIO RICARDO BETTINI, ORLANDO CELSO LONGO, LUCIANE FERREIRA ALCOFORADO, ALANA CAROLINE GAMBA MAIA," METHOD FOR ESTIMATING OF CONSTRUCTION COST OF A BUILDING BASED ON PREVIOUS EXPERIENCES" ISSN PRINT: 2164-3164, OPEN JOURNAL OF CIVIL ENGINEERING, 2016, 6, 749-763.

[6] SENEMBILIRANDEMREGURCANLI (2015) "AN APPROACH FOR SAFETY COST ESTIMATION OF BUILDING CONSTRUCTION".ABDELRAHMAN OSMAN ELFAKI,SALEHALATAWI AND EYADABUSHANDI,"USING INTELLIGENT TECHNIQUES IN CONSTRUCTION PROJECT COST ESTIMATION:10YEAR SURVEY" VOLUME 2014 ,ARTICLE ID 107926.

[7] MAGNE JORSENSEN, MARTIN SHEPPERED,A SYSTEMATIC REVIEW OF SOFTWARE DEVELOPMENT COST ESTIMATION STUDIES, IEEE, VOLUME: 33 , ISSUE: 1, JAN. 2007

[8] NIKHIL K GILSON1 , ALESTER JOSEPH VANREYK," REVIEW OF COST ESTIMATION MODELS",IJSER, ISSN (ONLINE): 2347-3878, IMPACT FACTOR (2014): 3.05.

[9] NAVENMARTINEE, NAVENAHRNJAKAJDUKOVIC, STJEPANBEZAK (2009) "COST ESTIMATE FOR THE CONSTRUCTION OF RESIDENTIAL-COMMERCIAL BUILDING".

[10] MOHAMMAD KABIR YAQUBI, SANDEEP SALHOTRA, THE AUTOMATED COST ESTIMATION IN CONSTRUCTION, IJITEE, ISSN: 2278-3075, VOLUME-8 ISSUE-7 MAY, 2019.