iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** IV **Month of publication:** April 2020

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IV Apr 2020- Available at www.ijraset.com

A Case Study on Cost Implication of an Educational Building (G+4)

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Abstract: ***Estimation is the approximate costing of a project that helps investors to decide on the shares, clients to allocate budget and contractors to forecast the budget of the project. Cost analysis is done at every stages of a project which is majorly categorized into two types, such as Initial capital cost, Operation and Maintenance cost. Cost considerations are continuously present from starting to end of the project which includes design cost, project cost, procurement cost, operation cost, maintenance cost and demolition cost. Cost is the most important factor to be considered in the planning of every project. Cost estimation is the vital part of any construction project that comes under Initial capital cost. Success of the project depends solely on cost estimation. Cost estimation helps the project to be cost effective and to control budget overrun, and therefore, it is essential to study and analyses the causes of construction delay. Construction claims can be controlled by proper estimation and can also avoid delay of the project. It prevents project owner from losing money and helps to avoid overpaying of the project. Proper design and layout of building structure is needed to estimate the cost. Cost estimation is the governing part of the earned value management which tracks the project performance with total time and cost estimate. The aim of the project is to analyze the cost for the construction of an educational building (G+4). This paper describes the basic forms of cost calculation for structures. The manual analysis of cost is done using Microsoft Excel sheet tool and the obtained results are compared with the bureaucratic values.***

Keywords: Cost estimation, Microsoft Excel sheet tool, Educational building, and Bureaucratic values.

I. INTRODUCTION

In general, most of the construction project duration ranges from several months to several years. This is due to the increases in labour cost and material cost. Hence, increase in the project cost is occurred. In construction industry, cost estimation is a very important factor to complete the project within the required budget. There are several factors which increases the cost of the project such as Material cost, Labor wage cost, Site condition, Inflation factor, Project schedule, Quality of plans and specifications, Reputation of engineer, Insurance requirements, Size and type of construction project, Location of construction and contingency. To overcome these factors, proper budget should be estimated at the initial stage of the construction project. To pay a lot of attention to the project planning, check whether labours stay within the scope that was originally planned, use good scheduling tools and check vendor's capabilities before hiring, constantly track and measure the progress which helps to complete the project within the estimated cost. Cost analysis can be developed at all the stages of investment process.

Estimation can be done at initial stages of an educational building which includes layout, design and analysis, planning and cost estimation of the building. Proper design and layout of buildings should be analysed by the structure which is succeeded by cost estimation. Most of the construction projects need extra timing and cost due to delay in completion. It is important to give more priority to cost of any project. In construction industry, several construction projects needs proper cost monitoring. The cost estimated in the initial stage of a project is very important to avoid cost overrun. The probable causes for overruns are Equipment leasing, Delay in progress payments, Poor coordination and communication between contractors, Lack of communication between contractors and vendors, Delay in delivering the materials, Unrealistic contract duration, Owner interference, Poor financial control mechanism, Unavailability of local materials, Incomplete proposals of suppliers, Heavy equipment higher cost for maintenance, High cost of labour, Conflicts between joint ownership, Unmanaged site increase the cost. The research work has identified that cost overruns are generally due to several factors such as unskilled equipment operators, slow response from clients, unmanaged sites, and delay in delivering materials, high labour cost, poor communication and coordination, delay in progress payments, poor quality of construction materials, lack of capable representative on the site, shortage of technical personnel.

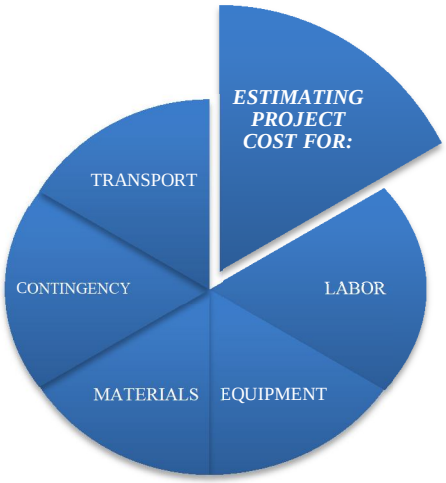
Based on the study of various literature reviews, it is suggested that larger efforts should be exerted on preparation of the plan, evaluation or estimation of cost to reduce risk of delay and over cost of the project implementation. This study is focused on general cost estimation of a four storey educational building (B+G+4).

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IV Apr 2020- Available at www.ijraset.com

II. COST ESTIMATION

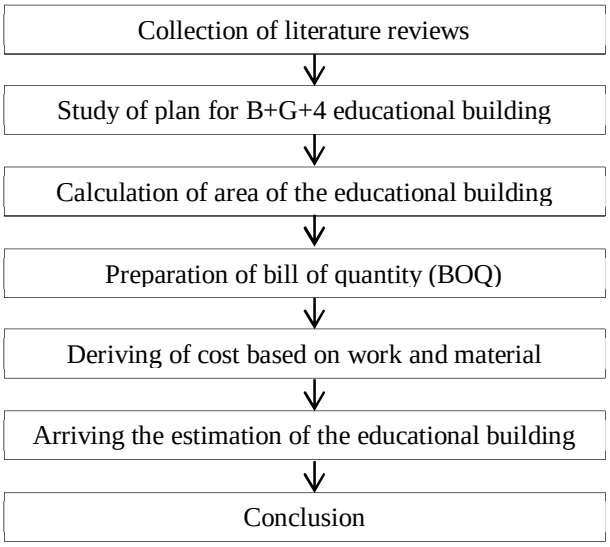
An approximation of the cost of a project can be termed as cost estimation. Cost implication refers to the total amount of project and completion of work within the required time. In this project, the cost estimation can be imputed based on work and resource/material. In many research papers, Estimate costs techniques include:

A. Expert judgement,
B. Analogous estimating,
C. Parametric estimating,
D. Bottom-up estimating,
E. 3 point estimating,
F. Reserve analysis,
G. Cost of quality,
H. Project management software,
I. Vendor bid analysis,
J. Group decision making.



III. METHODOLOGY

The following methodology has been adopted in order to accomplish the project work regarding cost estimation of an educational building:



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This project is completed in two phases. In the first phase, various literature reviews are collected. After several times of modifications in the plan, a four storeys educational building plan has been prepared, studied and all the necessary data regarding the construction project is collected. In second phase, calculation of quantity is carried out. Process of Bill of Quantity (BOQ) has been arrived. Then the cost can be derived based on the work and materials/resources.

IV. LITERATURE REVIEWS

The summary of overall collected literature reviews are listed below:

A. Reduction of cost for overall project can be analysed.
B. Activity continuation can be scheduled properly to complete the project within required time.
C. For procurement process and availability of machine can be taken for rent based on their need.
D. Better design, planning and scheduling can be done to avoid cost overrun.
E. Duration of construction project can also be analysed.

V. PROJECT DETAILS

The project details contain details of construction project, construction drawings, and estimation of ongoing construction projects.

A. Details of the Construction Project

1) Name of the project: Construction of Educational Building
2) Building type : B+G+4 Educational Building
3) Total built up area : 141497.49 Sq.ft
4) Planned duration : Six months
5) Planned start : 02.12.2019
6) Planned finish : 02.06.2020

B. Construction Drawings

In Construction industry, construction drawings are the base for all construction projects. It shows all the details of the project. We can extract maximum data from the drawings. Total project cost can be estimated using construction drawings.
Basement can be used for parking the vehicles (both two wheeler and four wheeler).
Ground floor consists of science class room 01,02,03,04, office room, main entrance, conference room, staff room, Arts class room 01,02, library, commerce class room 01,02,03,04, staircase for Ground floor to First floor.
First floor consists of commerce class room 05,06,07,08,09,10,11,12,13,14, computer lab, staff room 01,02, Arts class room 09,10, staircase for First floor to Second floor. Second floor, Third floor and Fourth floor are typical floor consists of Commerce class room 15,16,17,18,19,20,21,22,23,24,25 and 26, Staff room 01,02, Arts class room 22,23.
The plan of Basement, Ground floor, First floor and typical floor is shown in Fig.1, Fig.2, Fig.3 and Fig.4.

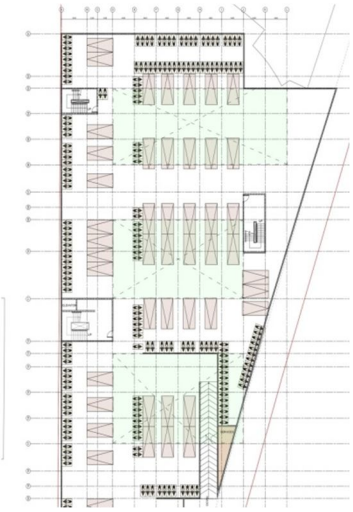


Fig.1 Basement plan

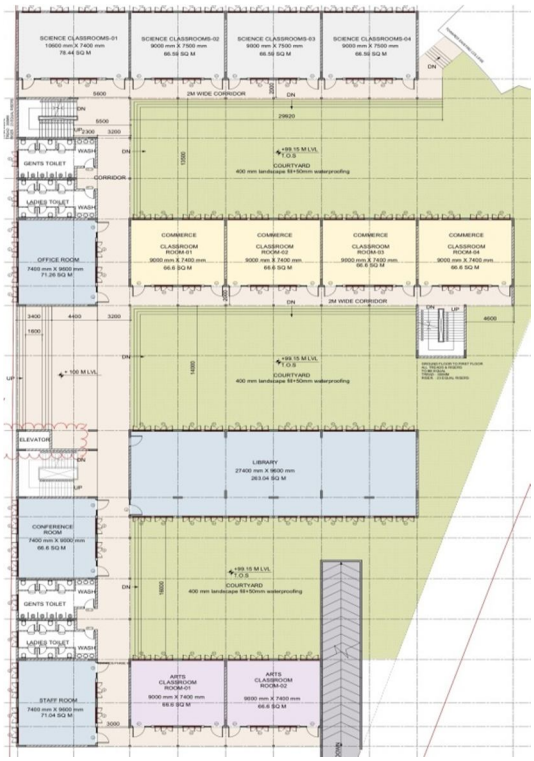


Fig.2 Ground floor plan

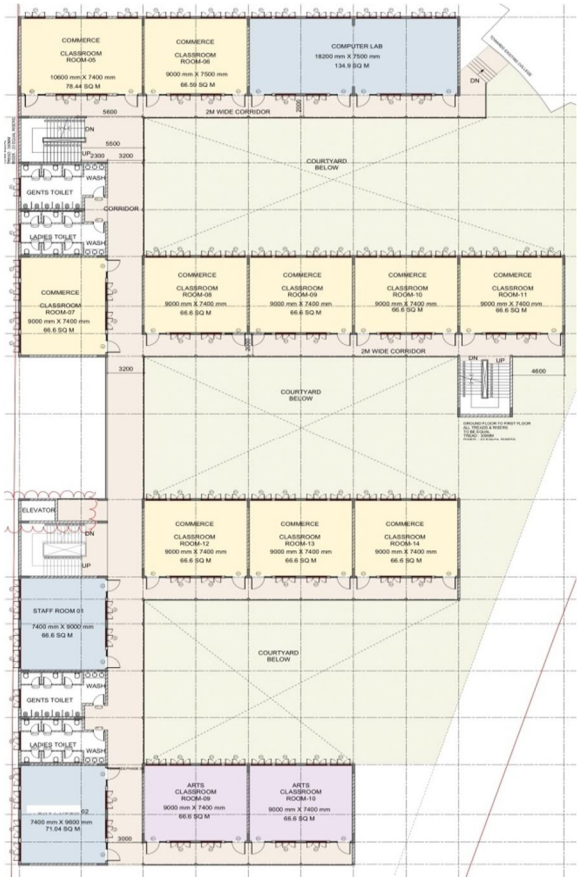


Fig.3 First floor plan

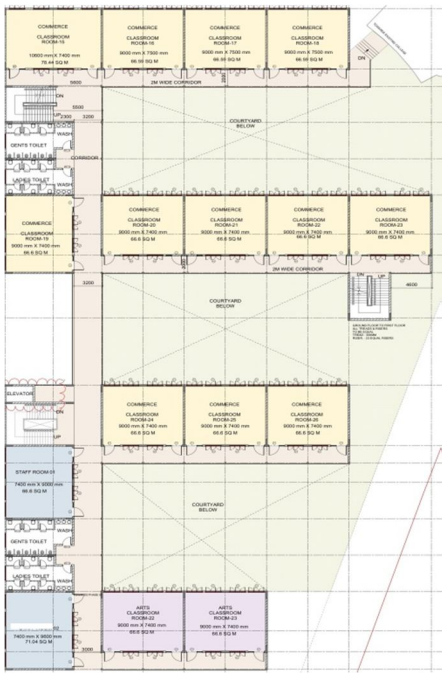


Fig.4 Typical floor plan

VI. CALCULATION OF QUANTITY

The total quantity of each work is arrived and shown in the Excel sheet table below:

A. Earthwork Excavation

NO.	DESCRIPTION	NOS.	L (m)	B (m)	D (m)	QUANTITY
1	**Earthwork excavation**					
	Underground car parking	1*1	3198.72		3.35	10715.71
	Footings I	1*14	4.15	4.15	1.50	361.67
	Footings II	1*22	3.85	3.85	1.50	489.14
	Footings III	1*4	3.50	4.25	1.50	89.25
	Footings IV	1*9	3.20	4.00	1.50	172.80
	Footings V	1*31	2.85	3.65	1.50	483.72
	Footings VI	1*12	2.40	3.20	1.50	138.24
	Footings VII	1*5	3.20	4.50	1.50	108.00
	Footings VIII	1*1	3.50	4.20	1.50	22.05
	Footings IX	1*22	2.60	1.95	1.50	167.31
	Walls around	1*1	261.80	0.60	1.50	235.62
					TOTAL	**12983.51**
						cu.m

B. Earth Filling

2	**Earth Filling**					
	Footings I	1*14	4.15	4.15	0.15	36.17
	Footings II	1*22	3.85	3.85	0.15	48.91
	Footings III	1*4	3.50	4.25	0.15	8.93
	Footings IV	1*9	3.20	4.00	0.15	17.28
	Footings V	1*31	2.85	3.65	0.15	48.37
	Footings VI	1*12	2.40	3.20	0.15	13.82
	Footings VII	1*5	3.20	4.50	0.15	10.80
	Footings VIII	1*1	3.50	4.20	0.15	2.21
	Footings IX	1*22	2.60	1.95	0.15	16.73
	Walls around	1*1	261.80	0.60	0.15	23.56
					TOTAL	**226.78**
						cu.m

C. Plain Cement Concrete 1:5:10

3	**Plain cement concrete 1:5:10**					
	Footings I	1*14	4.30	4.30	0.10	25.89
	Footings II	1*22	4.00	4.00	0.10	35.20
	Footings III	1*4	3.65	4.40	0.10	6.42
	Footings IV	1*9	3.35	4.15	0.10	12.51
	Footings V	1*31	3.00	3.80	0.10	35.34
	Footings VI	1*12	2.55	3.35	0.10	10.25
	Footings VII	1*5	3.35	4.65	0.10	7.79
	Footings VIII	1*1	3.65	4.35	0.10	1.59
	Footings IX	1*22	2.75	2.10	0.10	12.71
	Walls around	1*1	261.80	0.60	0.10	15.71
					TOTAL	**163.40**
						cu.m

D. R.C.C 1:2:4 for Footing and Columns

4	**R.C.C 1:2:4**					
	Footings I	1*14	4.15	4.15	0.60	144.67
	Footings II	1*22	3.85	3.85	0.60	195.66
	Footings III	1*4	3.50	4.25	0.60	35.70
	Footings IV	1*9	3.20	4.00	0.60	69.12
	Footings V	1*31	2.85	3.65	0.60	193.49
	Footings VI	1*12	2.40	3.20	0.60	55.30
	Footings VII	1*5	3.20	4.50	0.60	43.20
	Footings VIII	1*1	3.50	4.20	0.60	8.82
	Footings IX	1*22	2.60	1.95	0.60	66.92
	Columns I	1*14	0.75	0.75	11.00	86.63
	Columns II	1*22	0.75	0.75	11.00	136.13
	Columns III	1*4	0.20	1.00	11.00	8.80
	Columns IV	1*9	0.20	1.00	11.00	19.80
	Columns V	1*31	0.20	1.00	11.00	68.20
	Columns VI	1*12	0.20	1.00	11.00	26.40
	Columns VII	1*5	0.75	0.75	11.00	30.94
	Columns VIII	1*1	0.75	0.75	11.00	6.19
	Columns IX	1*22	0.20	0.60	11.00	29.04
	Walls around	1*1	261.80	0.60	1.50	235.62
	For grade beam	1*1	639.07	0.45	0.30	86.27
					TOTAL	**1546.88**
						cu.m

E. Brickwork in Superstructure 9" Thickness Wall

5	**Brick work in superstructure 9" thickness wall**					
	UNDER GROUND FLOOR					
	Walls around	1*1	261.80	0.23	3.35	201.72
	Staircase side walls	1*4	6.90	0.23	3.35	21.27
	GROUND FLOOR					
	Walls around	1*1	315.90	0.23	3.35	243.40
	Long walls	1*1	125.40	0.23	3.35	96.62
	Short walls	1*1	164.00	0.23	3.35	126.36
	Walls inside	1*1	8.40	0.15	2.44	3.07
	FIRST FLOOR					
	Walls around	1*1	241.10	0.23	3.35	185.77
	Long walls	1*1	130.80	0.23	3.35	100.78
	Short walls	1*1	188.30	0.23	3.35	145.09
	Walls inside	1*1	8.40	0.15	2.44	3.07
	SECOND FLOOR					
	Walls around	1*1	241.10	0.23	3.35	185.77
	Long walls	1*1	130.80	0.23	3.35	100.78
	Short walls	1*1	188.30	0.23	3.35	145.09
	Walls inside	1*1	8.40	0.15	2.44	3.07
	THIRD FLOOR					
	Walls around	1*1	241.10	0.23	3.35	185.77
	Long walls	1*1	130.80	0.23	3.35	100.78
	Short walls	1*1	188.30	0.23	3.35	145.09
	Walls inside	1*1	8.40	0.15	2.44	3.07
	FOURTH FLOOR					
	Walls around	1*1	241.10	0.23	3.35	185.77
	Long walls	1*1	130.80	0.23	3.35	100.78
	Short walls	1*1	188.30	0.23	3.35	145.09

DEDUCTION-Ground Floor					
Doors D	1*32	0.90	0.23	2.10	13.91
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*106	0.91	0.23	1.83	40.60
Ventilator V	1*4	0.60	0.23	0.60	0.33
DEDUCTION-First Floor					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
DEDUCTION-Second Floor					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
DEDUCTION-Third Floor					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
DEDUCTION-Fourth Floor					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
				TOTAL	**308.05**
				NET TOTAL	**2123.22**
					cu.m

F. R.C.C 1:2:4 for lintel beam, Sunshade, Roof Slab

6	**R.C.C 1:2:4**					
	LINTEL BEAM					
	GROUND FLOOR					
	Walls around	1*1	315.90	0.23	0.30	21.80
	Long wall	1*1	125.40	0.23	0.30	8.65
	Short wall	1*1	164.00	0.23	0.30	11.32
	Walls inside rooms	1*1	8.40	0.15	0.30	0.38
	FIRST FLOOR					
	Walls around	1*1	241.10	0.23	0.30	16.64
	Long wall	1*1	130.80	0.23	0.30	9.03
	Short wall	1*1	188.30	0.23	0.30	12.99
	Walls inside rooms	1*1	8.40	0.15	0.30	0.38
	SECOND FLOOR					
	Walls around	1*1	241.10	0.23	0.30	16.64
	Long wall	1*1	130.80	0.23	0.30	9.03
	Short wall	1*1	188.30	0.23	0.30	12.99
	Walls inside rooms	1*1	8.40	0.15	0.30	0.38
	THIRD FLOOR					
	Walls around	1*1	241.10	0.23	0.30	16.64
	Long wall	1*1	130.80	0.23	0.30	9.03
	Short wall	1*1	188.30	0.23	0.30	12.99
	Walls inside rooms	1*1	8.40	0.15	0.30	0.38
	FOURTH FLOOR					
	Walls around	1*1	241.10	0.23	0.30	16.64
	Long wall	1*1	130.80	0.23	0.30	9.03
	Short wall	1*1	188.30	0.23	0.30	12.99
	Walls inside rooms	1*1	8.40	0.15	0.30	0.38
	Walls around	1*1	241.10	0.23	0.30	16.64
	Long wall	1*1	130.80	0.23	0.30	9.03
	Short wall	1*1	188.30	0.23	0.30	12.99
	Walls inside rooms	1*1	8.40	0.15	0.30	0.38
	SUNSHADE					
	GROUND FLOOR					
	Window W	1*106	1.50	0.61	0.15	14.55
	FIRST FLOOR					
	Window W	1*100	1.50	0.61	0.15	13.73
	SECOND FLOOR					
	Window W	1*100	1.50	0.61	0.15	13.73
	THIRD FLOOR					
	Window W	1*100	1.50	0.61	0.15	13.73
	FOURTH FLOOR					
	Window W	1*100	1.50	0.61	0.15	13.73
	ROOF SLAB					
	Basement	1*1	3198.72		0.15	479.81
	Ground floor	1*1	2092.44		0.15	313.87
	First floor	1*1	1965.28		0.15	294.79
	Second floor	1*1	1965.28		0.15	294.79
	Third floor	1*1	1965.28		0.15	294.79
	Fourth floor	1*1	1965.28		0.15	294.79
					TOTAL	**2240.56**
						cu.m

G. 4 cm thick panelled shutters of Deak wood

7	**4cm thick panelled shutters of Deak wood**				
	Doors D	1*160	0.90	2.10	302.40
	Doors D1	1*90	0.83	2.10	156.87
	Window W	1*506	0.91	1.20	552.55
	Ventilator V	1*20	0.60	2.10	25.20
				TOTAL	**1037.02**
					sq.m

H. Ceiling Plastering

8	**Ceiling plastering**					
	SUNSHADE					
	Over window W-Ground floor	1*106	1.50	1.20		190.80
	Over window W-First floor	1*100	1.50	1.20		180.00
	Over window W-Second floor	1*100	1.50	1.20		180.00
	Over window W-Third floor	1*100	1.50	1.20		180.00
	Over window W-Fourth floor	1*100	1.50	1.20		180.00
	GROUND FLOOR					
	Science class room 1	1*1	10.60	7.40		78.44
	Science class room 2	1*1	9.00	7.50		67.50
	Science class room 3	1*1	9.00	7.50		67.50
	Science class room 4	1*1	9.00	7.50		67.50
	Office room	1*1	7.40	9.60		71.04
	Commerce class room 1	1*1	9.00	7.40		66.60
	Commerce class room 2	1*1	9.00	7.40		66.60
	Commerce class room 3	1*1	9.00	7.40		66.60
	Commerce class room 4	1*1	9.00	7.40		66.60
	Library	1*1	27.40	9.60		263.04
	Conference room	1*1	7.40	9.00		66.60
	Staff room	1*1	7.40	9.60		71.04
	Arts class room 1	1*1	9.00	7.40		66.60
	Arts class room 2	1*1	9.00	7.40		66.60
	Toilet	1*2	7.40	9.00		133.20
	Verandah	1*1	187.61	3.00		562.83
	FIRST FLOOR					
	Commerce class room 5	1*1	10.60	7.40		78.44
	Commerce class room 6	1*1	9.00	7.50		67.50
	Computer lab	1*1	18.20	7.50		136.50
	Commerce class room 7	1*1	9.00	7.50		67.50
	Commerce class room 8	1*1	9.00	7.40		66.60
	Commerce class room 22	1*1	9.00	7.40		66.60
	Commerce class room 23	1*1	9.00	7.40		66.60
	Commerce class room 24	1*1	9.00	7.40		66.60
	Commerce class room 25	1*1	9.00	7.40		66.60
	Commerce class room 26	1*1	9.00	7.40		66.60
	Staff room 1	1*1	7.40	9.00		66.60
	Staff room 2	1*1	7.40	9.60		71.04
	Arts class room 22	1*1	9.00	7.40		66.60
	Arts class room 23	1*1	9.00	7.40		66.60
	Toilet	1*2	7.40	9.00		133.20
	Verandah	1*1	187.61	3.00		562.83
					TOTAL	**9883.93 sq.m**

I. Exterior and Interior wall Plastering using CM 1:5

9	**Interior and Exterior wall plastering using CM 1:5**					
	EXTERIOR WALL					
	Walls all around	1*1	343.37		11.00	3777.07
	INTERIOR WALL					
	BASEMENT					
	Walls around	1*1	261.80		3.35	877.03
	GROUND FLOOR					
	Science class room 1	1*1	36.00		3.35	120.60
	Science class room 2	1*1	33.00		3.35	110.55
	Science class room 3	1*1	33.00		3.35	110.55
	Science class room 4	1*1	33.00		3.35	110.55
	Office room	1*1	34.00		3.35	113.90
	Commerce class room 1	1*1	32.80		3.35	109.88
	Commerce class room 2	1*1	32.80		3.35	109.88
	Commerce class room 3	1*1	32.80		3.35	109.88
	Commerce class room 4	1*1	32.80		3.35	109.88
	Library	1*1	74.00		3.35	247.90
	Conference room	1*1	32.80		3.35	109.88
	Staff room	1*1	34.00		3.35	113.90
	Arts class room 1	1*1	32.80		3.35	109.88
	Arts class room 2	1*1	32.80		3.35	109.88
	Toilet	1*2	32.80		3.35	219.76
	Verandah	1*1	381.22		3.35	1277.09
	FIRST FLOOR					
	Commerce class room 5	1*1	36.00		3.35	120.60
	Commerce class room 6	1*1	33.00		3.35	110.55
	Computer lab	1*1	51.00		3.35	170.85
	Commerce class room 7	1*1	33.00		3.35	110.55
	Commerce class room 8	1*1	32.80		3.35	109.88

Verandah	1*1	381.22		3.35	1277.09
			TOTAL WALL PLASTERING		**20873.13**
					sq.m
DEDUCTION					
GROUND FLOOR					
Doors D	1*32	0.90	0.23	2.10	13.91
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*106	0.91	0.23	1.83	40.60
Ventilator V	1*4	0.60	0.23	0.60	0.33
FIRST FLOOR					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
SECOND FLOOR					
Doors D	1*36	0.90	0.23	2.10	1.74
Doors D1	1*18	0.83	0.23	2.10	1.60
Window W	1*100	0.91	0.23	1.83	1.53
Ventilator V	1*4	0.60	0.23	0.60	0.33
THIRD FLOOR					
Doors D	1*36	0.90	0.23	2.10	1.74
Doors D1	1*18	0.83	0.23	2.10	1.60
Window W	1*100	0.91	0.23	1.83	1.53
Ventilator V	1*4	0.60	0.23	0.60	0.33
FOURTH FLOOR					
Doors D	1*36	0.90	0.23	2.10	1.74
Doors D1	1*18	0.83	0.23	2.10	1.60
Window W	1*100	0.91	0.23	1.83	1.53
Ventilator V	1*4	0.60	0.23	0.60	0.33
				TOTAL	**139.17**
			NET TOTAL		**20733.95**
					sq.m

J. Floor finishing with Cement using CM 1:4

10	**Floor finishing with cement using CM 1:4**				
	BASEMENT				
	Basement parking pavement	1*1	3198.72	0.15	479.81
	GROUND FLOOR				
	Science class room 1	1*1	10.60	7.40	78.44
	Science class room 2	1*1	9.00	7.50	67.50
	Science class room 3	1*1	9.00	7.50	67.50
	Science class room 4	1*1	9.00	7.50	67.50
	Office room	1*1	7.40	9.60	71.04
	Commerce class room 1	1*1	9.00	7.40	66.60
	Commerce class room 2	1*1	9.00	7.40	66.60
	Commerce class room 3	1*1	9.00	7.40	66.60
	Commerce class room 4	1*1	9.00	7.40	66.60
	Library	1*1	27.40	9.60	263.04
	Conference room	1*1	7.40	9.00	66.60

Commerce class room 11	1*1	9.00	7.40	66.60
Commerce class room 12	1*1	9.00	7.40	66.60
Commerce class room 13	1*1	9.00	7.40	66.60
Commerce class room 14	1*1	9.00	7.40	66.60
Conference room	1*1	7.40	9.00	66.60
Staff room	1*1	7.40	9.60	71.04
Arts class room 1	1*1	9.00	7.40	66.60
Arts class room 2	1*1	9.00	7.40	66.60
Toilet	1*2	7.40	9.00	133.20
Verandah	1*1	187.61	3.00	562.83
FOURTH FLOOR				
Commerce class room 5	1*1	10.60	7.40	78.44
Commerce class room 6	1*1	9.00	7.50	67.50
Computer lab	1*1	18.20	7.50	136.50
Commerce class room 7	1*1	9.00	7.50	67.50
Commerce class room 8	1*1	9.00	7.40	66.60
Commerce class room 9	1*1	9.00	7.40	66.60
Commerce class room 10	1*1	9.00	7.40	66.60
Commerce class room 11	1*1	9.00	7.40	66.60
Commerce class room 12	1*1	9.00	7.40	66.60
Commerce class room 13	1*1	9.00	7.40	66.60
Commerce class room 14	1*1	9.00	7.40	66.60
Conference room	1*1	7.40	9.00	66.60
Staff room	1*1	7.40	9.60	71.04
Arts class room 1	1*1	9.00	7.40	66.60
Arts class room 2	1*1	9.00	7.40	66.60
Toilet	1*2	7.40	9.00	133.20
Verandah	1*1	187.61	3.00	562.83
			TOTAL	**9460.14**
				sq.m

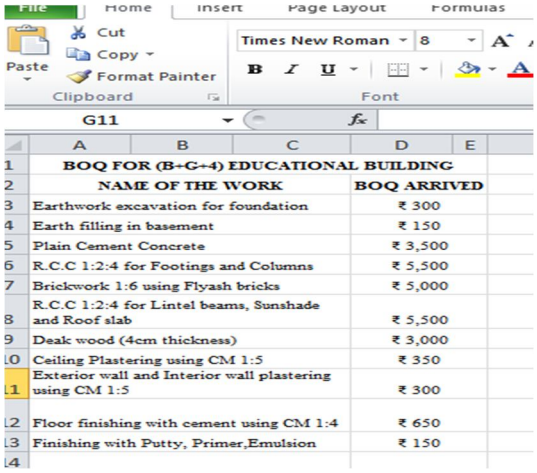
K. Finishing with deluxe multi Surface Paint System

11	**Finishing with deluxe muilti surface paint system for exterior walls, interior walls, basement upto fourth floor**				
	EXTERIOR WALL				
	Walls all around	1*1	343.37	11.00	3777.07
	INTERIOR WALL				
	BASEMENT				
	Walls around	1*1	249.43	3.35	835.59
	GROUND FLOOR				
	Science class room 1	1*1	36.00	3.35	120.60
	Science class room 2	1*1	33.00	3.35	110.55
	Science class room 3	1*1	33.00	3.35	110.55
	Science class room 4	1*1	33.00	3.35	110.55
	Office room	1*1	34.00	3.35	113.90
	Commerce class room 1	1*1	32.80	3.35	109.88
	Commerce class room 2	1*1	32.80	3.35	109.88
	Commerce class room 3	1*1	32.80	3.35	109.88
	Commerce class room 4	1*1	32.80	3.35	109.88
	Library	1*1	74.00	3.35	247.90
	Conference room	1*1	32.80	3.35	109.88
	Staff room	1*1	34.00	3.35	113.90
	Arts class room 1	1*1	32.80	3.35	109.88
	Arts class room 2	1*1	32.80	3.35	109.88
	Toilet	1*2	32.80	3.35	219.76
	Verandah	1*1	381.22	3.35	1277.09
	FIRST FLOOR				
	Commerce class room 5	1*1	36.00	3.35	120.60
	Commerce class room 6	1*1	33.00	3.35	110.55
	Computer lab	1*1	51.00	3.35	170.85
	Commerce class room 7	1*1	33.00	3.35	110.55
	Commerce class room 8	1*1	32.80	3.35	109.88
	Commerce class room 9	1*1	32.80	3.35	109.88
	Commerce class room 10	1*1	32.80	3.35	109.88
	Commerce class room 16	1*1	33.00	3.35	110.55
	Commerce class room 17	1*1	33.00	3.35	110.55
	Commerce class room 18	1*1	33.00	3.35	110.55
	Commerce class room 19	1*1	32.80	3.35	109.88
	Commerce class room 20	1*1	32.80	3.35	109.88
	Commerce class room 21	1*1	32.80	3.35	109.88
	Commerce class room 22	1*1	32.80	3.35	109.88
	Commerce class room 23	1*1	32.80	3.35	109.88
	Commerce class room 24	1*1	32.80	3.35	109.88
	Commerce class room 25	1*1	32.80	3.35	109.88
	Commerce class room 26	1*1	32.80	3.35	109.88
	Staff room 1	1*1	32.80	3.35	109.88
	Staff room 2	1*1	32.80	3.35	109.88
	Arts class room 1	1*1	32.80	3.35	109.88
	Arts class room 2	1*1	32.80	3.35	109.88
	Toilet	1*2	32.80	3.35	219.76
	Verandah	1*1	381.22	3.35	1277.09
	FOURTH FLOOR				
	Commerce class room 15	1*1	36.00	3.35	120.60
	Commerce class room 16	1*1	33.00	3.35	110.55
	Commerce class room 17	1*1	33.00	3.35	110.55
	Commerce class room 18	1*1	33.00	3.35	110.55

				TOTAL	20831.69 sq.m
DEDUCTION					
GROUND FLOOR					
Doors D	1*32	0.90	0.23	2.10	13.91
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*106	0.91	0.23	1.83	40.60
Ventilator V	1*4	0.60	0.23	0.60	0.33
FIRST FLOOR					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
SECOND FLOOR					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
THIRD FLOOR					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
FOURTH FLOOR					
Doors D	1*36	0.90	0.23	2.10	15.65
Doors D1	1*18	0.83	0.23	2.10	7.22
Window W	1*100	0.91	0.23	1.83	38.30
Ventilator V	1*4	0.60	0.23	0.60	0.33
				TOTAL	308.05
				NET TOTAL	20523.63 sq.m

VII. PREPARATION OF BILL OF QUANTITY (BOQ)

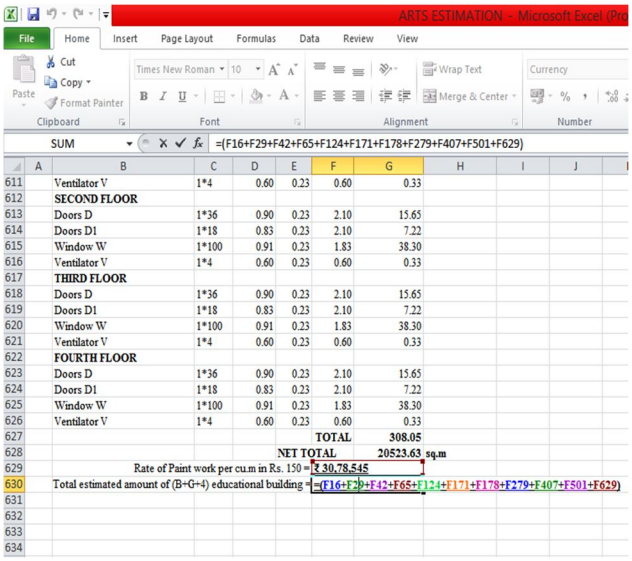
The bill of quantity can be prepared based on each work, resources, equipment and labours and it is shown below in an excel sheet table.



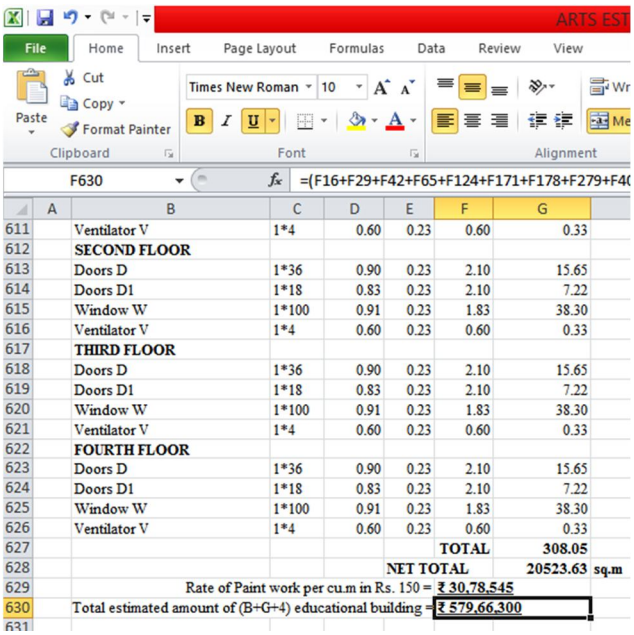
	A	B
1	BOQ FOR (B+G+4) EDUCATIONAL BUILDING	
2	NAME OF THE WORK	BOQ ARRIVED
3	Earthwork excavation for foundation	₹ 300
4	Earth filling in basement	₹ 150
5	Plain Cement Concrete	₹ 3,500
6	R.C.C 1:2:4 for Footings and Columns	₹ 5,500
7	Brickwork 1:6 using Flyash bricks	₹ 5,000
8	R.C.C 1:2:4 for Lintel beams, Sunshade and Roof slab	₹ 5,500
9	Deak wood (4cm thickness)	₹ 3,000
10	Ceiling Plastering using CM 1:5	₹ 350
11	Exterior wall and Interior wall plastering using CM 1:5	₹ 300
12	Floor finishing with cement using CM 1:4	₹ 650
13	Finishing with Putty, Primer,Emulsion	₹ 150
14		

VIII. ESTIMATE OF TOTAL COST OF THE BUILDING

Therefore, the overall estimated cost of this educational building is Five crores Seventy Nine lakhs Sixty Six thousand Three hundred only (₹ 5,79, 66,300) and is shown in the below Excel sheet tool.



	A	B	C	D	E	F	G	H	I	J
611		Ventilator V	1*4	0.60	0.23	0.60	0.33			
612		**SECOND FLOOR**								
613		Doors D	1*36	0.90	0.23	2.10	15.65			
614		Doors D1	1*18	0.83	0.23	2.10	7.22			
615		Window W	1*100	0.91	0.23	1.83	38.30			
616		Ventilator V	1*4	0.60	0.23	0.60	0.33			
617		**THIRD FLOOR**								
618		Doors D	1*36	0.90	0.23	2.10	15.65			
619		Doors D1	1*18	0.83	0.23	2.10	7.22			
620		Window W	1*100	0.91	0.23	1.83	38.30			
621		Ventilator V	1*4	0.60	0.23	0.60	0.33			
622		**FOURTH FLOOR**								
623		Doors D	1*36	0.90	0.23	2.10	15.65			
624		Doors D1	1*18	0.83	0.23	2.10	7.22			
625		Window W	1*100	0.91	0.23	1.83	38.30			
626		Ventilator V	1*4	0.60	0.23	0.60	0.33			
627						TOTAL	308.05			
628					NET TOTAL		20523.63 sq.m			
629		Rate of Paint work per cu.m in Rs. 150 =				₹ 30,78,545				
630		Total estimated amount of (B+G+4) educational building =				=(F16+F29+F42+F65+F124+F171+F178+F279+F407+F501+F629)				
631										
632										
633										
634										



	A	B	C	D	E	F	G
611		Ventilator V	1*4	0.60	0.23	0.60	0.33
612		**SECOND FLOOR**					
613		Doors D	1*36	0.90	0.23	2.10	15.65
614		Doors D1	1*18	0.83	0.23	2.10	7.22
615		Window W	1*100	0.91	0.23	1.83	38.30
616		Ventilator V	1*4	0.60	0.23	0.60	0.33
617		**THIRD FLOOR**					
618		Doors D	1*36	0.90	0.23	2.10	15.65
619		Doors D1	1*18	0.83	0.23	2.10	7.22
620		Window W	1*100	0.91	0.23	1.83	38.30
621		Ventilator V	1*4	0.60	0.23	0.60	0.33
622		**FOURTH FLOOR**					
623		Doors D	1*36	0.90	0.23	2.10	15.65
624		Doors D1	1*18	0.83	0.23	2.10	7.22
625		Window W	1*100	0.91	0.23	1.83	38.30
626		Ventilator V	1*4	0.60	0.23	0.60	0.33
627						**TOTAL**	**308.05**
628					**NET TOTAL**		**20523.63** **sq.m**
629		Rate of Paint work per cu.m in Rs. 150 =				**₹ 30,78,545**	
630		Total estimated amount of (B+G+4) educational building =				**₹ 579,66,300**	

IX. CONCLUSION

In India, most of the company end with Penalty for extra timings and this will lead to cost overrun. Proper construction project includes better estimation, proper layout and scheduling, proper resources. It is more important to give priority to the cost of the project. In this project, the estimation for an on-going project of B+G+4 educational building is done. This estimated amount is considered by the contractor company and is useful for the company if they follow proper scheduling and use better resources.

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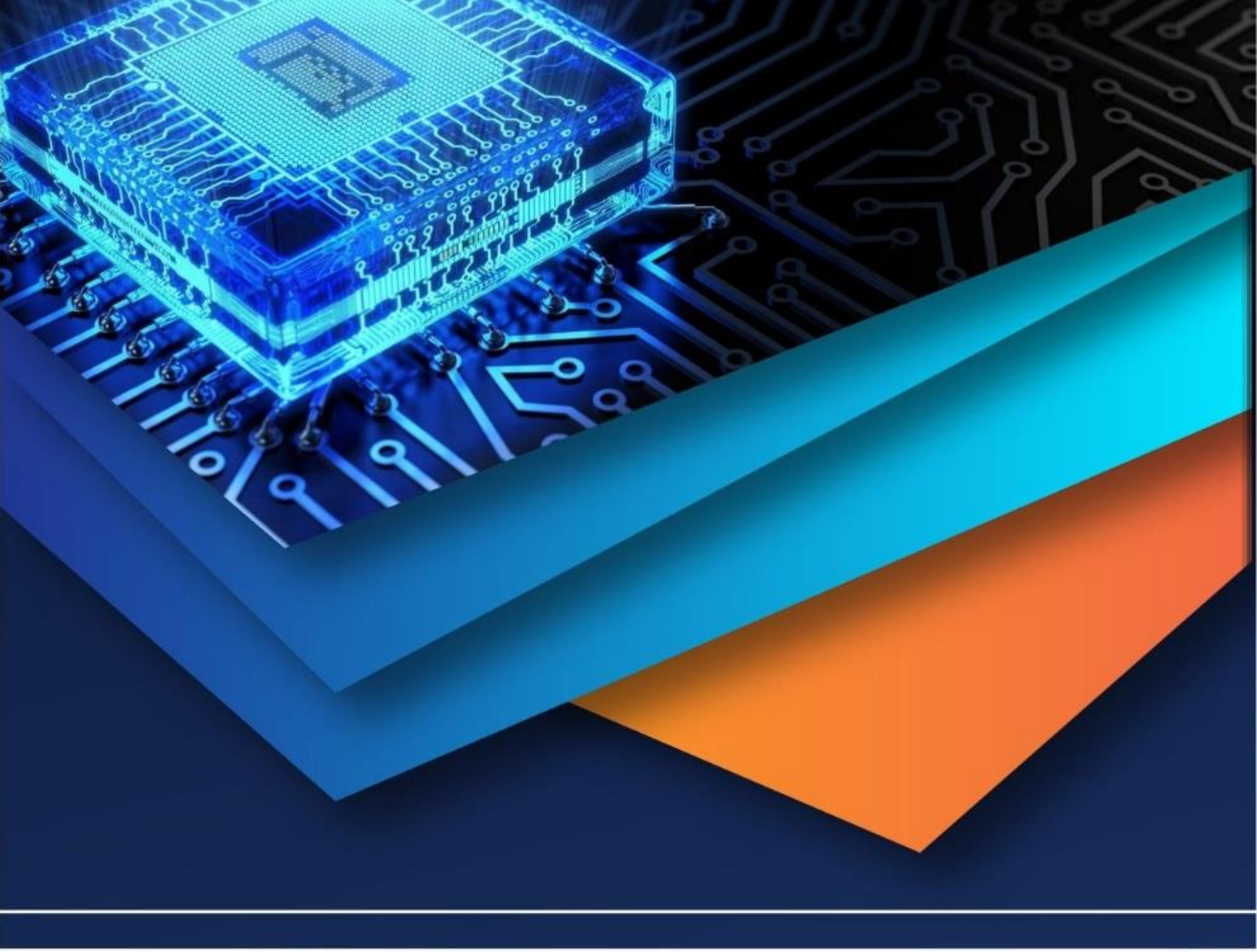

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