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Cost Dissimilitude of 2BHK Telangana Independent Houses

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Abstract: ***Economical construction of residential building has become a part of the day to day development. By that the construction of the economical building gained importance, their method of constructions also gained importance. In this present experimental study on the estimate of 2BHK proposed by government of Telangana for the poor people. According to the actual estimated cost of the building that is 5.40lakhs. But after replacing some material and by using new technology for construction we can reduce the cost of the construction .The material replaced are Robo sand instead of River sand. Hence we would partially replace the material so as to get the enough strength.***
The Estimation and design not only require imaginations but also good municipal bylaws with experience and judgement. The relevant Indian standards codes are used for the estimations and design.
Keywords: Compression Strength, Estimation, Robo Sand, 2BHK

I. INTRODUCTION

Telangana government provided an ambitious two bedroom housing scheme for the residents of the state for poor people. The scheme named Double Bed Room Housing Scheme in Telangana State. Telangana government spent 5.40 lakh per house in the urban areas. By taking such development scheme for the poor people had fulfilled of having their own houses. Erravelli to be First Village under Telangana 2BHK Housing Scheme, after that it took many urban and village areas to have such constructions.
In this present experimental study we took one such 2bhk construction at Maddulapally village of Khammam Rural Mandal in Khammam. The each house having area of 560sft. As the cost estimated to be was 5.40 lakh per houses but we will estimate the cost and reduce it by replacing materials partially so as to get enough strength.

A. Estimation

For all construction purposes it is required to know the probable cost of construction known as the cost of estimation. The estimated cost means an estimate of the final total cost of execution of a construction project. If the estimated cost is greater than the money available, then attempts are made to reduce the cost by reduction the work or by changing the specifications. In preparing an estimate of different items of work are calculated by simple menstruation method and from these quantities the cost is calculated.
Main purpose of estimating costs is to provide a size reference for cost control, to verify that the resources consumed during the execution of the project are kept in the costs assessed in feasibility phase of the project. Deviations from these issues can endanger the profitability of the project and a successful project can turn into a disaster.
Estimates handle a number of different functions in the construction industry. In the initial stages of a construction program, the owner needs an estimate of the possible cost of construction. Once the design of the project is underway, budget amounts can be established for the various elements of the project. The rates in the estimate provide for the complete work, which consists of the cost of materials, cost of labour, cost of scaffolding, cost of tools and plants, cost of water, taxes, establishments and supervision cost, reasonable profit of contractor, etc. Here in this present experimental study we will estimate the cost of Telangana 2bhk houses and we will reduce the cost by using partial replacement material in fine aggregate.

B. Robo sand History and its construction

Manufactured sand is typically noted by different labal such as Crushed sand, UltraMod Sand, Rock sand, Green sand, , Robo sand, Barmac sand, Pozzolan sand etc. IS 383-1970 (Reaffirmed 2007) remembering manufacture sand as 'Crushed Stone Sand.
Crushed stone sand is produced by crushing rubble. Manufactured sand is produced by rock-on-rock Vertical Shaft Impactor in which the system that produced alluvial security is closely simulated. Particle size reduction and complete equidimensional shape is

critical to get covet properties. If rock is crushed in compression lot of inherent properties exhibited by natural river sand are lost. If proper technique of manufacturing is not adopted aggregates are bound to become flaky and stretched. Improvements to sand by way of washing, grading and blending may have to be done before use at the consumer end. In case of manufactured sand all the processes specified above can be done at manufacturing plant itself and controls are much better in producing quality fine aggregates.

Fine aggregates manufactured sand planned to be used shall be formed from a Vertical Shaft Impact quarrel and shall integrate to the compulsion of Zone-II as per IS 383-1970 and particles finer than 75 µm shall not exceed 15 %. Special efforts on the part of M-sand manufacturers are required to reduce particles finer than 75 µm to 15%. The overall trend is to utilize dry classification solutions to produce manufactured sand. The dry separation process separates fine and coarse particles.

C. Issues and General Requirements of Manufactured Sand

Now-a-days, the Govt have put ban on lifting sand from River bed. Transportation of sand harms the roads. Removing sand from river bed shock the environment, as water table goes deeper & ultimately dry.

General Requirements:

1) All the sand particles should have higher crushing strength
2) The surface texture of the particles should be smooth
3) The edges of the particles should be grounded
4) The ratio of fines below 600 microns in sand should not be less than 30%.
5) There should not be any organic impuritie
6) Silt in sand should not be more than 2%, for crushed sand
7) In manufactured sand the permissible limit of fines below 75 microns shall not exceed 15%.

D. Materials

1) *Cement:* Ordinary Portland cement of 53 grade cement is used confirming to various specifications

Table .1: properties of cement

Physical properties	Values for OPC
Standard consistency	32%
Sp gravity	3.15
Initial setting time	30min
Final setting time	600min
Soundness(Le-chartlier)	10mm

2) *Fine aggregate*

Table .2: properties of Fine aggregate

Properties	Values of fine aggregate
sp gravity	2.55
finess modulus	2.78
water absorption	6%
moisture content	1.00%
Bulk density	1710kg/m^3

3) *Coarse aggregate*: Crushed coarse aggregate of 20mm down size is obtained from local quarry site were used for the experimentation. used which is confirming to IS: 2386-1975.Results obtained showed below.

Table .3: properties of Fine aggregate

Properties	values of coarse aggregate
sp gravity	2.75
finess modulus	5.9
water absorption	2.50%
moisture content	0.50%
Bulk density	1530kg/m^3

4) *Robo sand*

Robo sand or M-Sand was used as replacement of fine aggregate. The raw material is either granite or basalt rock. Robo sand is a product of crushed stone, here the stones are crushed into smaller granular size of river sand granules and washed to remove the fine rock dust to enhance the quality as per IS: 2386-1975. Below table shows the properties of Robo sand.

Table .3: properties of Fine aggregate

Properties	values of Robo sand
sp gravity	2.66
finess module	2.81

II. LITERATURE RIVIEW

1) Chitlangeet al (2008) have reported about the feasibility of the usage of artificial sand obtained by crushing basalt over natural sand considering technical, environmental and commercial factors. From the test results it was observed that the 28 day compressive strength was 5.08%, 4.56% and 3.78% higher than conventional concrete for M20, M30 and M40 grade respectively. They concluded that the concrete processed by using artificial sand have more strength compared to ordinary concrete.
2) Priyanka A. Jagadev and Dilip K. Kulkarni (2012) have conducted experiments on concrete to determine mechanical properties using manufactured sand. Specimens were cast using M20 concrete with water cement ratio 0.45, replacing sand from 0-100% at increments of 20%. It was concluded that manufactured sand has a potential to provide different to natural sand and helps in maintaining the environment as well as economical balance.
3) Hudson (1997) has conducted experiments to study the performance of concrete by adding manufacturing sand instead of sand. He concluded that the concrete may be used with 20% replacement of sand by manufactured sand and it was more durable and less permeable.

III.METHODOLOGY

Different experiments and tests were conducted in the laboratory so to proof a better substitute for natural aggregate with Robo sand and to compensate the lack of natural aggregates as per their demand all around the world. This chapter establishes the need of use of Robo sand as a partial replacement of natural aggregates in concrete in order to achieve sustainable development. So below are the required experiments conducted

A. Specific gravity test on cement
B. Slump cone test on concrete
C. Casting and curing.
D. Compression strength test

1) *Specific gravity of cement :* specific gravity of cement is 3.15
2) *Slump cone test on concrete:* This was measured by conducting slump test. Keeping the water-cement ratio at 0.45, the slump values were determined for M20 using river sand and Manufactured Sand as fine aggregate. Concrete with river sand gave higher slump value. IS 456 code specifies a minimum slump of 50 mm for medium workability. The concrete mix met this requirement irrespective of the type of sand.
3) *Casting and curing:* Each layer of the concrete filled in the mould shall be condensing by not less than 35 strokes by tamping bar. The strokes shall be penetrating into the underlying layer and the bottom layer shall be rodded through its depth. Where voids are left by the tamping bar the sides of the mould shall be tapped to close the voids.
4) *Compression strength test :* Compressive strength of concrete out of many test applied to the concrete, this is the utmost important which gives an idea about all the tendency of concrete. By this single test one expert that whether Concreting has been done properly or not. For cube test specimens cubes of 15 cm X 15 cm X 15 cm is used. 9 Cubes of 150 x 150 x 150 mm size shall have been casted, 3 for 7-days testing, 3 for 14-days testing and 3 for 28 days testing. Compressive strength was determined by testing the 7,14,28 days cured cube specimens. The mean compressive strength values of cube specimens are reported in Table 2. Compressive strength of M20 grade concrete with Manufactured Sand as fine aggregate is ***6 – 9% higher*** when compared to the results using river sand as fine aggregate.
5) MIX DESIGN FOR M20 GRADE Nominal mix for M20 is 1:1.5:3

IV. METHODOLOGY

Before and after testing of specimens it was obtained that concrete having higher strength when tested under CTM ,when it was partially replaced with Robo sand and cured for 7, 14, 28 days. Maximum strength was obtained by this replacement when compared to natural sand.

A. Compressive strength of the concrete by 7days curing

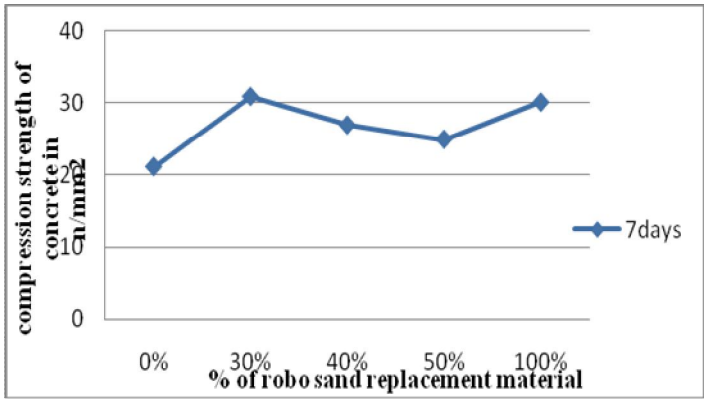
1) 0 % of Replacement for natural sand by Robo sand when the Compressive strength with 7 days of curing Average compressive strength 21.11 KN/m

2) 30 % of Replacement for natural sand by Robo sand when the Compressive strength with 7 days of curing Average compressive strength 30.89KN/m

3) 40 % of Replacement for natural sand by Robo sand when the Compressive strength with 7 days of curing Average compressive strength 26.89KN/m^2

4) 50 % of Replacement for natural sand by Robo sand when the Compressive strength with 7 days of curing Average compressive strength 24.89KN/m^2

5) 100 % of Replacement for natural sand by Robo sand when the Compressive strength with 7 days of curing Average compressive strength 30.10KN/m^2



Graph 1: compressive strength of concrete for 7days

B. Compressive strength of the concrete by 14days curing

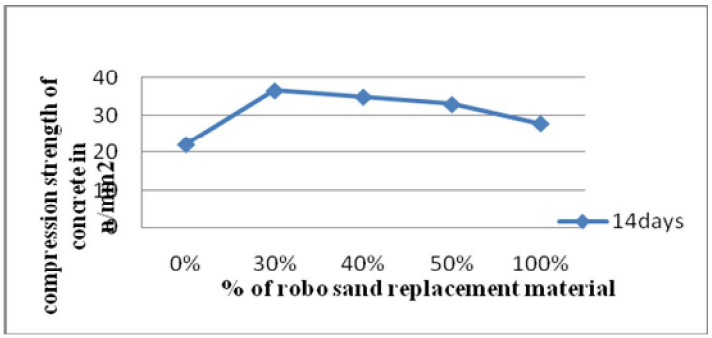
1) 0 % of Replacement for natural sand by Robo sand when the Compressive strength with 14 days of curing Average compressive strength 22 KN/m^2

2) 30 % of Replacement for natural sand by Robo sand when the Compressive strength with 14 days of curing Average compressive strength 36.55 KN/m^2

3) 40 % of Replacement for natural sand by Robo sand when the Compressive strength with 14 days of curing Average compressive strength 34.89 KN/m^2

4) 50 % of Replacement for natural sand by Robo sand when the Compressive strength with 14 days of curing Average compressive strength 32.88 KN/m^2

5) 100 % of Replacement for natural sand by Robo sand when the Compressive strength with 14 days of curing Average compressive strength 27.77 KN/m^2



Graph 2: compressive strength of concrete for 14days

C. Compressive strength of the concrete by 28days curing

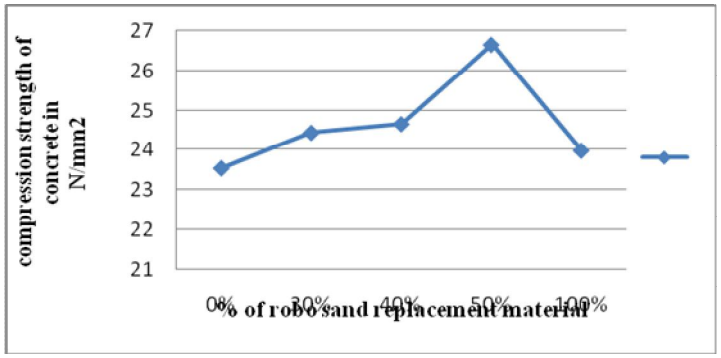
1) 0 % of Replacement for natural sand by Robo sand when the Compressive strength with 28 days of curing Average compressive strength 23.55 KN/m^2

2) 30 % of Replacement for natural sand by Robo sand when the Compressive strength with 28 days of curing Average compressive strength 24.44 KN/m^2

3) 40 % of Replacement for natural sand by Robo sand when the Compressive strength with 28 days of curing Average compressive strength 24.66 KN/m^2

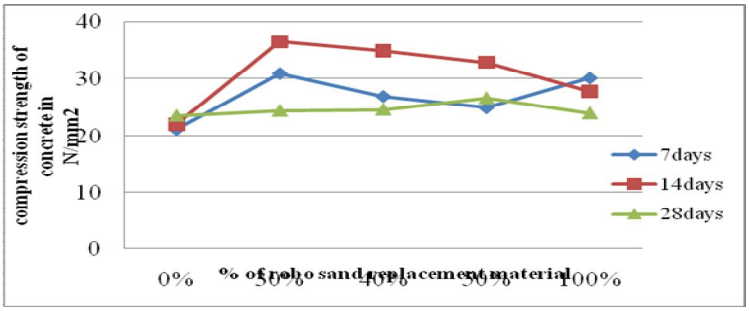
4) 50 % of Replacement for natural sand by Robo sand when the Compressive strength with 28 days of curing Average compressive strength 26.66 KN/m^2

5) 100 % of Replacement for natural sand by Robo sand when the Compressive strength with 28 days of curing Average compressive strength 23.99 KN/m^2



Graph 3: compressive strength of concrete for 14days

D) The below graph shows the comparison of compression strength of 7,14, 28 days by representing compression strengths on y-axis and x- axis representing %of Robo sand replacement material



Graph 4: Comparison of compressive strength of concrete for 7, 14, 28days

V. PLAN OF THE TELANGANA 2BHK & ESTIMATIONS

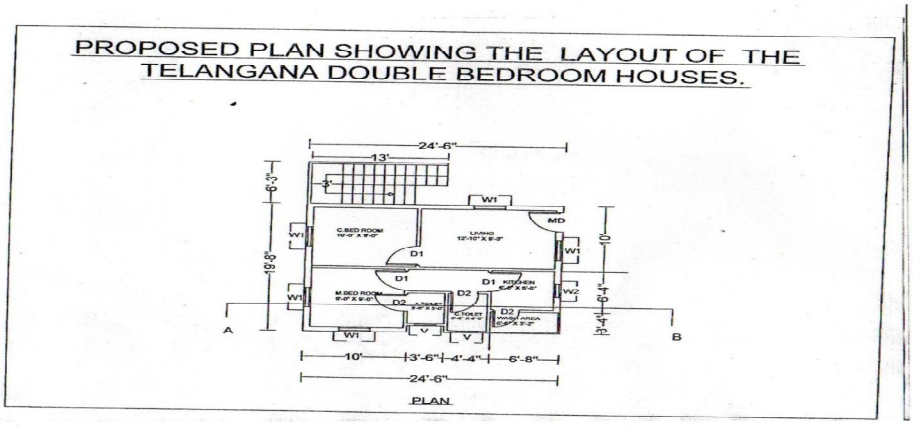


Fig: 1 shows the proposed plan of Telangana 2BHK

Table .4: Estimation of Telangana 2bhk Independent Houses

S.NO	ITEM	QUANTITY IN CUBIC FEETS	QUANTITY IN CUM	NO.S	RATE PER UNITS	TOTAL AMOUNT
1	EARTH WORK	742.77	21.02	1	224.4	4716.89
2	EARTH FILLING UP TO PLINTH BOTTOM	1631.92	46.18	1	28.85	1332.29
3	PCC [M15]	116.14	3.28	1	4384.28	14380.44
4	RR MASONARY	508.12	14.38	1	3135.5	45088.49
5	BRICK WORK	411.52	11.64	1	5390.3	62743.09
6	PLASTERING	1218.08 SQ.FT	112.06	1	304.2	34088.65
7	RCC[M2O]					
	1 .FOOTING	151.94	4.3	1	8787.6	37786.68
	2 .PLINTH BEAMS	99.29	2.81	1	10748.6	30203.57
	3 .COLUMNS	87.06	2.46	1	10042.05	24703.44
	4 .R.BEAMS	114.13	3.22	1	9268.65	29845.05
	5 .SLAB	190.81	5.39	1	9268.65	49958.02
	6 .WAIST SLAB & STEPS	77.73	2.2	1	9268.65	20391.03
	7 .CHAJJA	2.59	0.07	1	9268.65	648.81
8	STEEL					
	1 .MAT	50.88 KGS		1		
	2 .COLUMN	317.66 KGS		1		
		93.01 KGS		1		
	3 .PLINTH BEAM	90.40 KGS		1		
		25.95 KGS		1		
		182.08 KGS	1.63	1	58888.15	95987.68
	4 .RF BEAMS	525.83 KGS		1		
	5 .SLAB	230.3 KGS		1		
	6 .STAIR CASE	120.07 KGS		1		
	7 .CHAJJA	3.5 KGS		1		
9	FIXING OF DOORS			7	2800	19600
	WINDOWS			6	1500	9000
10	WHITE WASH		120 KGS	3	750	2250
11	ELECTRICAL			1		21600

	&PLUMBING (4%)					
12	DPC FLOORING	120.96	3.42	1	4384.28	14994.24
13	PARTITION WALL	87.61	2.47	1	5390.3	13314.04
14	PLASTING	262.18	24.18	1	304.2	7355.56
						Total cost=539987.97

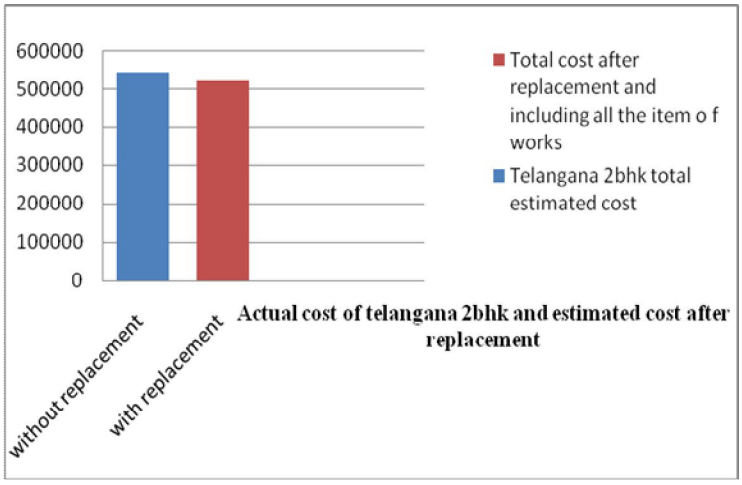
Table .5: ESTIMATION AFTER REPLACEMENT OF MATERIAL (ROBO SAND 50%)

S.NO	ITEM	QUANTITY IN CUBIC FEETS	QUANTITY IN CUM	RATE PER UNITS	TOTAL AMOUNT
1	FOOTING				
2	PLINTH BEAMS				
3	COLUMNS				
4	R.BEAMS		20.45		173072.72
5	SLAB				
6	WAIST SLAB & STEPS				
7	CHAJJA				
					Total cost =173072.72

Table 6: ESTIMATION INCLUDING ALL ITEMS WITH REPLACEMENTS

S.NO	ITEM	QUANTITY IN CUBIC FEETS	QUANTITY IN CUM	RATE PER UNITS	TOTAL AMOUNT
a)	RCC[M2O]				
1	FOOTING				
2	PLINTH BEAMS				
3	COLUMNS				
4	R.BEAMS	720.96	20.45	-	173072.72
5	SLAB				
6	WAIST SLAB & STEPS				
7	CHAJJA				
b)	RR MASONARY				45088.49
c)	BRICK WORK	411.52	11.64	5390.3	62743.09
d)	STEEL	1549.28KGS	-	-	95987.68

e)	FIXING OF DOORS & WINDOWS	-	-	-	28600
f)	EARTH WORK	742.77	21.02	224.4	4716.89
g)	EARTH FILLING UP TO PLINTH BOTTOM	1631.92	46.18	28.85	1332.29
h)	PCC [M15]	116.14	3.28	4384.28	14380.44
i)	PLASTERING	1218.08 SQ.FT	112.06 SQM	304.2	34088.65
j)	WHITE WASH	-	120 KGS	750	2250
k)	ELECTRICAL &PLUMBING (4%)	-	-	-	21600
l)	DPC FLOORING	120.96	3.42	4384.28	14994.24
m)	PARTITION WALL	87.61	2.47	5390.3	13314.04
n)	PLASTING	262.18	24.18	304.2	7355.56
TOTAL COST =519524.09					



Graph 5: Estimation cost of 2bhk Telangana house and estimated cost after replacements including all item of works

VI. CONCLUSIONS

The estimated cost of the Telangana 2bhk is 5.40 lakhs and the whole rate which was estimated after replacement with Robo sand was found to be with a difference of Rs 20000. The total cost after replacement was observed as Rs 519524.09 and including all the item of work the final difference obtained is Rs 20000.

By replacement of natural sand with Robo sand, the cost of the construction can be reduced to 10% per cum. The estimations which were compared with Telangana 2bhk were reduced by the partial replacement material of fine aggregate. The compressive strength of concrete specimens made with 50% replacement of river sand by Robo sand gives higher strength of 12% to 15%.So as compare with river sand, the strength obtained was more.

The test results and the cost analysis reported in this paper showed that there are good prospects of obtaining a good concrete strength at relatively cheaper cost even while replacing part of the sand with Crushed Granite Fine. Compressive Strength of 23 N/mm² to 33 N/mm² can be obtained using a nominal mix ratio hitherto required for Compressive Strength of 20 N/mm².Higher water-cement ratio is required when Crushed Granite Fine is used in replacing sand during concrete production.

Based on this finding, it is recommended that partial replacement of sand with 25 – 37.5% Crushed Granite Fines be used in concrete production where higher grade than the mix ratio is desired. Also, where there are abundant supplies of Crushed Granite Fines, replacement up to 100% may be used when the strength desired is not at variance with normal mix ratio.

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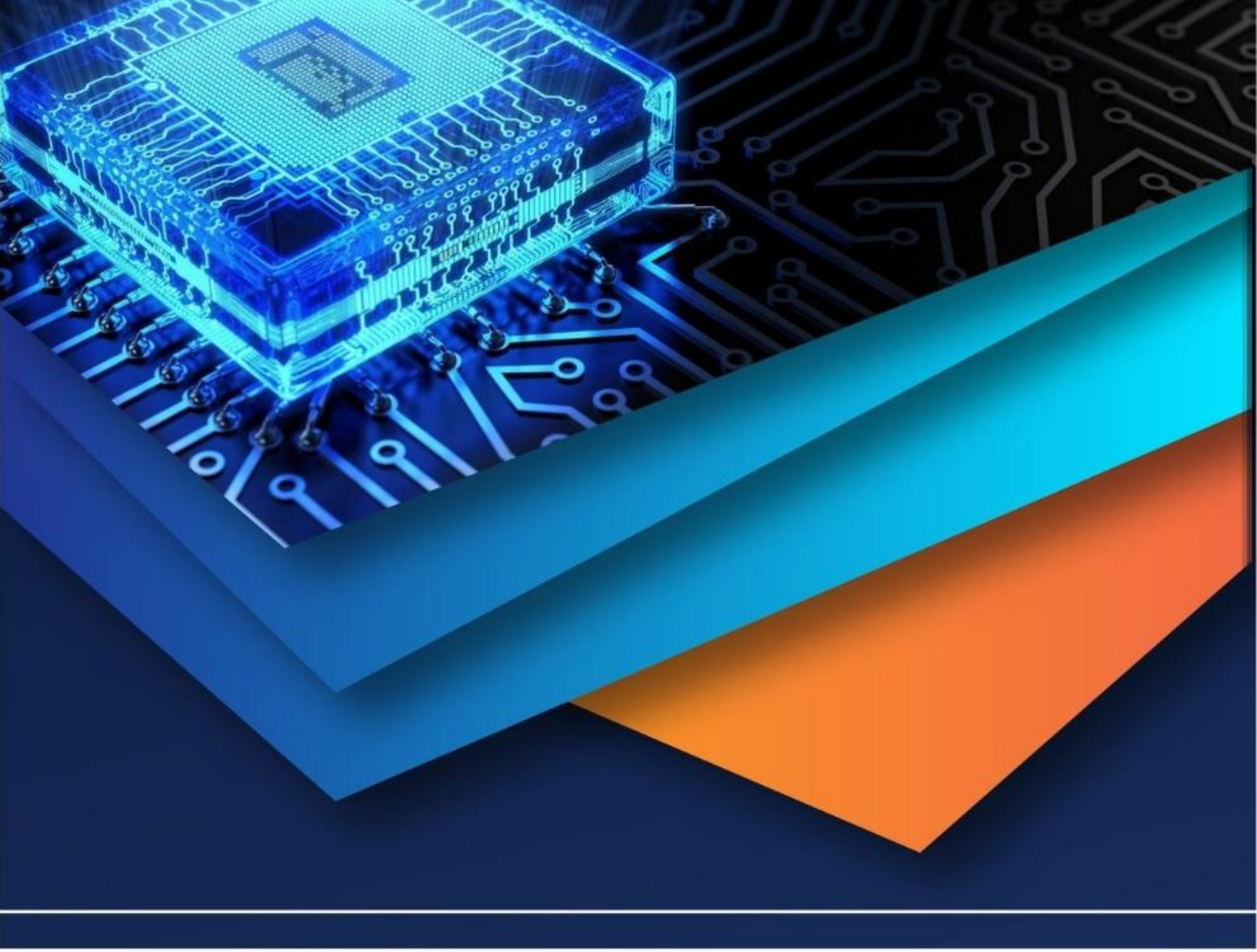

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