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Real Time Monitoring System for Multi-storey Building

[1]Abhishek S Gupta
[1]B.E, M.tech.
[1]Construction Management.
[1]VJTI, Mumbai, India

Abstract: Construction is the basic need of day to day life. Construction of new buildings, highways, roadways, etc. is very common practice and is carried out on a day to day basis. With the construction of such structure, safety plays a vital role. Managing large projects considering various factors of safety, quality assurance, and execution makes a hectic or tedious job to perform. [6] Real time monitoring system (RTMS) reduces many tragic and non-tragic injuries in the construction industries. To attain this objective this technique requires two parameters:
(1) Execution and casting of different members;
(2) Taking into account the safety of workers.
This proactive intervention can ultimately promote a safer working environment for construction workers. Management of labors, engineers and contractors can go smoothly without any misunderstanding or misleading.

INTRODUCTION

Construction is the basic need of day to day life. Construction of new buildings, highways, roadways, etc. is very common practice and is carried out on a day to day basis. With the construction of such structure, safety plays a vital role. Managing large projects considering various factors of safety, quality assurance, and execution makes a hectic or tedious job to perform. [6] Real time monitoring system (RTMS) reduces many tragic and non-tragic injuries in the construction industries. To attain this objective this technique requires two parameters: (3) Execution and casting of different members; and (4) Taking into account the safety of workers. This proactive intervention can ultimately promote a safer working environment for construction workers. Management of labors, engineers and contractors can go smoothly without any misunderstanding or misleading.

NEED OF THE STUDY.

As we all know that there is uncertainty and chaotic conditions that occurs on site which is tragic or non-tragic, which is very dangerous to the construction sites (specifically for the workers)? Falling of labours from high rise tower, material opening of shuttering, loosing of jack (support), etc. this are the undesirable tragic incident can occur on site. By implementing RTMS on construction site one can reduce these tragic and undesirable casualties. Unambiguous positioning of workers one can be known with the help of this system and with this an alarm can be made to alert the required worker. Cost effective Productive Labour management

3.1 Sample Space

Observation and intervention of same building with different wings data collection were done with Visual Supervision and with Automation technique on various floor plate level.

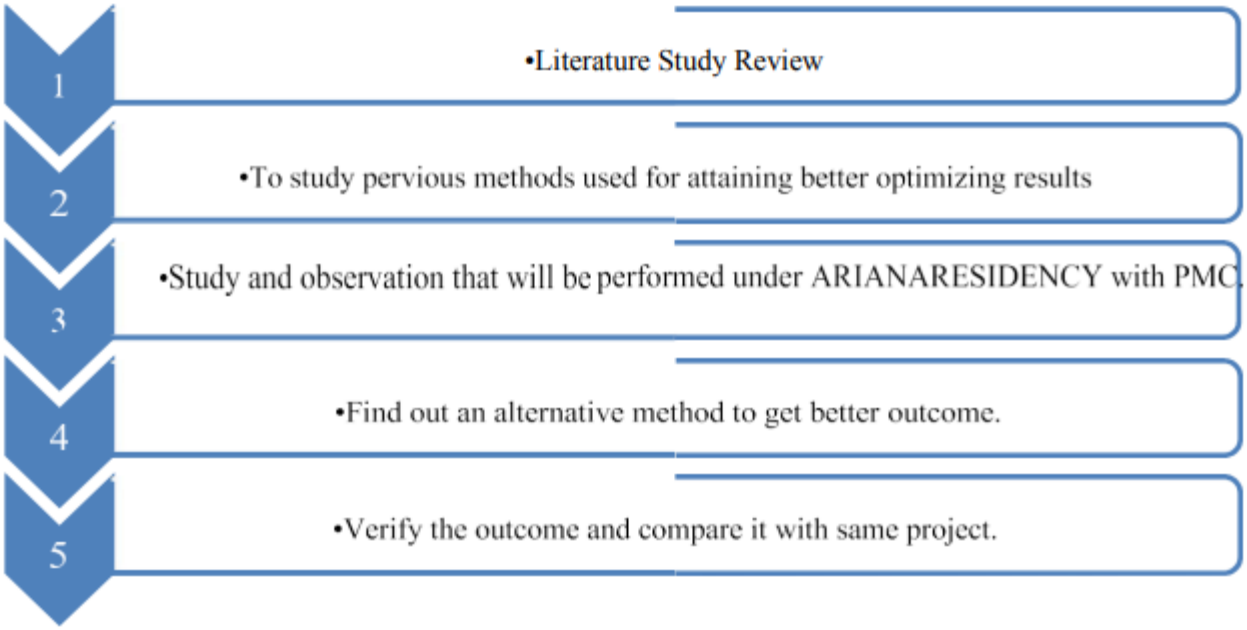
3.2 Theoretical framework

To reduce or to nullify the incidents/accidents that occurs on construction sites by using the video camera setup.

RESEARCH METHODOLOGY

1. Literature study of previous work related to safety and real time locating system.
2. Study of materials or impedimenta used to on construction site.
   a) Setup of impedimenta.
   b) Handling or operating difficulties.
   c) Getting results up to approximate.
   d) Errors associated with the results.
3. Study and observation that will be performed under ARIANA RESIDENCY with PMC.

4. To find out alternative method to get better outcome.



3.3.1 Data analysis

Slab Area per floor

Calculation of shuttering, concreting and reinforcement:
Total concrete for B-wing is 58 m3 and C-wing is 60 m^3 Rate analysis for M25 grade of concrete.

3.3.2 Calculation for concrete

For M25 mix proportion 1:1:2 i.e. (Cement: Sand: aggregate) Taking 10m3 Dry volume of concrete for wet volume=10*1.57 = 15.7 m^3

(1) Cement volume = (1/1+1+2)*15.7 =3.925 m^3 No cement bags= (3.925*1440)/50 =113 bags
(2) Sand = (1/1+1+2)*15.7 =3.925 m^3
(3) Aggregate = (2/1+1+2)*15.7 =7.85m^3

Table 3.3.3: Analysis for concrete material (B-Wing)

Sr.no	Particular	Unit	Content per10 m^3	For 58 m^3	Rate/unit	Floors	Cost
1	Cement	Bags	113	5.8	320	20	4,194,560.00
2	Sand	Cum	3.925	5.8	7800	20	3,551,340.00
3	Aggregate	Cum	7.85	5.8	1500	20	1,365,900.00
	Total						91,11,800.00

Table 3.3.4: Labour Analysis (B-Wing)

Sr.no	Particular	Unit	Nos/m^3	Rate	For 58	Floors	Cost
1	Mason	Nos	2.5	400	58	20	1,160,000.00
2	Helper	Nos	5	300	58	20	1,740,000.00
	Total						2,900,000.00

Table 3.3.5 Analysis for concrete material (C-Wing)

Sr.no	Particular	Unit	Content per 10 m^3	For 60 m^3	Rate/unit	Floors	Cost
1	Cement	Bags	113	6	320	20	4,339,200.00
2	Sand	Cum	3.925	6	7800	20	3,673,800.00
3	Aggregate	Cum	7.85	6	1500	20	1,413,000.00
	Total						9,426,000.00

Table 3.3.6 Labour Analysis (C-Wing)

Sr.no	Particular	Unit	Nos/m^3	Rate	For 60	Floors	Cost
1	Mason	Nos	2	400	60	20	928,000.00
2	Helper	Nos	3.5	300	58	20	1,218,000.00
	Total						2,146,000.00

Table 4.13 Comparison chart

Description	Wing B	Wing C
Area Sqft	2741	2758
Shuttering cost for labour	5,863,312.00	5,304,980.00
Steel cost for labour	16,362,000	16,164,000
Cost For Camera	Nil	86,671.00
Cost for Supervisor	7,92,000	5,28,000
Concreting cost for labour	2,900,000.00	2,146,000.00
Concrete Cost for material	9,111,800.00	9,426,000.00

IV. RESULTS AND DISCUSSION

4.1 This table contains calculated and observed values from the site by continuous monitoring for straight 1 month. However the below shown figures have been calculated for the overall project

Table 4.1.1

Sr.No	Description Wing	WB	WC	(WB-WC)
1	Shuttering cost for labour	5863312	5304980	558332
2	Steel cost for labour	16362000	16164000	198000
3	Cost For Camera	Nil	86671	-86671
4	Cost for Supervisor	792000	528000	264000
5	Concreting cost for labour	2900000	2146000	754000
	Sum	25917312	24229651	1687661

Allocating the wing-B and Wing-C as X and Y respectively. To calculate the efficiency of overall project in percentage to the respective. The below formula will furnish us the required results:

Efficiency of overall project in percentage (Ƞ) = $\frac{\Sigma x - \Sigma x}{\Sigma x}$x100

Total cost for Wing-B=ΣWB=ΣX=25917312

Total cost for Wing-C=ΣWC=ΣY=24229651

Σ (WB-WC) =ΣX −ΣY=1687661

Therefore, overall improved efficiency for the project = (16, 87,661/2, 59, 17,312)*100

=**6.512%**

In the same manner, we had assigned the various observed values to their respective variables to calculate the individual cost efficiency heads. Hence, as per required concern to optimize the cost of project while comparing the same floor area we had reach to an argument that cost can be reduced. The shuttering labour cost efficiency is 9.522% comparatively calculated from above formula. Similarly the cost for steel and concrete laying is reduced and their efficiency is calculated i.e., 1.21% and 23% respectively. The efficiency percentage associated with supervisor was found to be 33.33% per annual. Overall improved efficiency in project is 6.512%, thus saving the project cost around 1,687,661**.**

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