

Enhancement of Labor management at construction sites

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1. Abstract-

Civil engineering construction industry imparts vital significance in the infrastructural development of a country. This research work promotes study of various civil engineering work perform on a residential building along with the labor charges and number of days of work. Further a comparative statement is prepared from the economy and duration of project. Instead of item rate method a local method of brass work is adopted for the whole study work.

2. Introduction

The construction industry is one of the largest industries, because of its large presence; it makes a significant contribution to the national economy and provides jobs to large no of peoples. In recent year India's construction sector has investment in both not only public but also in private sector enterprises. Large amount of investment made in construction commercial and residential buildings etc. Number of approaches has been developed to improve the efficiency and effectiveness of construction process by applying statistical analysis. There is no proper definition for the labour productivity. It is a very important factor that affects the overall productivity of construction. Different labors shows different level of productivity and that affects the overall time and profit of construction.

Method study and work measurement study is carried out to asses human effectiveness by improved planning and sound incentives scheme to its employees and this used for increase productivity and reduce waste. The purpose of this work is to know the benefits of time and motion study employed in construction sector. For measure productivity of various construction activities are using by the time and motion study and work sampling. Enhance improvement of the productivity apply time and motion study and statistical analysis to various construction processes to the observations data sets generated for various construction process on site and determine their productivity and establishes regression equation using statistical analysis. The principal tool used for collection of data is quantitative survey (numerical values). The respondents involve project engineers, site engineers and contractors.

The objective of this study is that we have to understand factors like as physical working conditions, environment, availability of resources, infrastructure at the workplace, group dynamics and communication among employees and employer, work motivation, stress at the workplace,

work-life balance for betterment of society life and its implementation. This study is carried out based on literature reviews, educational expert reviews, observation. Now safety management is keenly required to handle on construction site as a prime requirement. Though, the accidents are going to happen in a large scale. It is observed that about 98% of accidents on site can be avoided but remaining 2 % accidents are unavoidable. A common approach should be planned for prevention of construction accident is to predict the upcoming event under given circumstances. The accuracy of such predictions is based on the knowledge about past accidents.

It has been proved that the main reason for the accidents in the construction industry are resulted from the unique nature of the industry, human behavior, difficult work site conditions and poor safety management which results in unsafe work method.

3. Need

Need for study given below-

- 1) To analyze the economical and statistical analysis of a country or a particular construction firms in a country
- 2) To improve occupational education, training and living standards of construction labours
- 3) To ensure safety and healthy environment for a construction labours
- 4) To attain work satisfaction
- 5) To reach better economical and social development
- 6) To offer a dynamic measure of economic growth

4. Literature Review-

1. Current Practices on Labor Management in Building Construction Projects, (May 2014)-

This paper describes the current labor management practices in building construction projects in Myanmar. In this study, construction labor management practices can be viewed as four categories which are labor management practices affect on project, manpower problems by shortcoming of labor management practices, factors on increasing labor productivity by good labor management practices and factors on reducing labor productivity by poor labor management practices. The principal tool used for collection of data is quantitative survey (numerical values); questionnaires for field survey. Data for the survey are obtained through a structured questionnaire administered to respondents in number of 80.

The respondents involve 20 project engineers, 45 site engineers and 15 contractors. The responses from all respondents are analyzed by using Relative Important Index (RII) method to rank the factors. In addition, H test or Kruskal-Wallis test is used to check the opinions of all respondents. From the H test results, the opinions of all respondents on labor management functions affect on project, factors on increasing labor productivity and reducing labor productivity are identical. But the opinions on manpower problems are not identical.

2. A STUDY OF CONTRACT LABOUR AT A REAL ESTATE AND CONSTRUCTION COMPANY (Dr. Hemant J. Katole, March- April 2016)-

A review of construction workers management functions has been done to find out gaps / deficiencies, if any, in compliance with provisions of the applicable Acts & Rules and understand the constraints and suggest ways and means to overcome. Also, a survey has been done among construction workers at various project sites of the company in Maharashtra, to ascertain factors mostly affecting their motivation, satisfaction with the employer, efficiency & work hour productivity.

3. CONTRACT LABOUR MANAGEMENT SYSTEM, Monisha, (March 2014)

The project is associated to maintain the details about Contractor and Labor, their work details and work order details. The number of contract and labor details and the period of their employment are maintained. Manual process of overall system is too complicated and will take lot of time, thus using our application the contract details handled by the contractor are faster in a short period of time. It is easy to find out all licenses expired details. So we can easily intimate those sub-contractors whose licenses are expired. It reduces the employee's time in getting reports, maintaining, Updating and deleting the license details of sub-contractors. This application shows the all registration fee details like welfare fund deposit, security deposit details. It maintains all the record lists and also we can get the any type of report immediately as per the requirement .The user of software must be able to do different tasks involved in the labor management during updating details of labor in the system.

4. CHALLENGES FACED ON A CONSTRUCTION SITE BY WORKERS1

Rapid industrialization and population explosion in India has led to the migration of peoples from villages to cities which increase human settlement in world's growing cities and towns. This generates several issues. Indian construction industry is rapidly growing at a rate of 9.2% as against the world average of 5.5%. During this development "Challenges faced on a construction site by workers" i.e. engineers, labors, contractors, designers, clients etc is very important. By considering the humanitarian point of view we have to study and analyze each and every aspect about work, health, safety, living etc of workers who contributes in development of society.

The objective of this study is that we have to understand factors like as physical working conditions, environment, availability of resources, infrastructure at the workplace, group dynamics and communication among employees and employer, work motivation, stress at the workplace, work-life balance for betterment of society life and its implementation. This study is carried out based on literature reviews, educational expert reviews, observation and questionnaire survey.

5. ENHANCE LABOUR PRODUCTIVITY THROUGH APPLICATIONS OF WORK AND STUDY PRINCIPLES FOR A RESIDENTIAL SITE (Mayuri Sanjay et.al. volume 6,issue no.7,July, 2017)

The construction industry is one of the largest industries, because of its large presence; it makes a significant contribution to the national economy and provides jobs to large no of peoples. In recent year India's construction sector has investment in both not only public but also in private sector

enterprises. Large amount of investment made in construction roads, ports, power plants, urban infrastructural development etc.

Number of approaches has been developed to improve the efficiency and effectiveness of construction process by applying statistical analysis. There is no proper definition for the labour productivity. It is a very important factor that affects the overall productivity of construction. Different labours shows different level of productivity and that affects the overall time and profit of construction.

6. Objective

Bellow some objective of the project are given-

- 1) To identify the requirements of labor i.e. facilities to provide
- 2) To identify the factor affecting the variation of labor productivity
- 3) To identify the main factor associated with loss of labor productivity
- 4) To study impact of influenced factor on the variation of labor productivity
- 5) To conduct a survey and plan a construction project so as to optimize number of labor.
- 6) This study has been focused on primary data search by obtaining views from laborers as well as contractors/owners/managers. The study identifies factors affecting productivity at construction sites and to study and analyses the consequential impact of labor productivity on other resources of construction

7. Methodology

1. Detailed survey regarding safety of labors, wages, number of labors per task, compensation for accidental cases.
2. Comparison of traditional method of labor management to research method to optimize and suggest the remedial measures for the same.
3. To reduce the project cost and duration as well as to enhance the quality of work, safety of labors

And hence the labor management by optimizing the work and duration for a task

Table 1- Collected information from construction site of G+1 residence at Kagal.

Type of Work	Time (Day)	No. Labour			Rates Rs./day			
		Mestry	Bigari	Female	Mistri	Bigari	Female	
1.Survey work								
Lineout	2	2	2		500	400		3600
Excavation	3	0	3	3		400	300	6300
2.Construction of Foundation								
PCC	2	1	2		600	400		2800
Footing 1)Steel bending	2	2	2		600	400		4000
2)Casting	4	3	4	4	600	400	300	18400
Ground Beam								
1)steel work	2	2	2		600	400		4000

2)Casting	4	3	3		600	400		12000
Brick work up to plinth	3	2	3		600	400		7200
Murum filling	1		4	4		400	300	2800
Vibrating	1		1			3000		3000
PCC Floor	3	2	3	0	600	400	0	7200
3.Construction of super structure								
Column	9	2	6	4	600	400	300	.
Brickwork up to lintel	17	3	5	4	600	400	300	.
Lintel and loft	6	2	3		600	400		14400
Brickwork up to slab	4	2	4		600	400		12000
Beam and Slab								
1)Centring	10	4	5		600	400		44000
2)Steel	10	4	5		600	400		44000
bending								
3)Casting	2	3	3		600	400		6000
4)lump sum	2							30000
Stair case	10	3	4	3	600	400	300	45000
4.Fixing door and windows	10							15000
5.Plumbing								10000
6.Electrification								10000
7.flooring								17000
8.Plastering								
1)External	16	3	4		600	400		54000
2)Internal	8	3	4		600	400		27200
3)ceiling	4	3	4		600	400		13600
9.compound wall	10	2	4		600	400		28000
10.Painting								45000
11.white washing	1		2	2		300	200	1000
	146							599900

Table 2-Collected information from construction site of GF residence at Bhakti Construction

Type o Work	Time (Day)	No. Labour			Rates Rs./day			
		Mistri	Bigari	Female	Mistri	Bigari	Female	
1.Survey work								
Lineout	2	2	2		500	400		3600
Excavation	4	0	4	4		400	300	11200
2.Construction of Foundation								
PCC	2	2	2		600	400		4000
Footing 1)Steel								
bending	2	2	2		600	400		4000
2)Casting	4	2	4		600	400		11200
Ground Beam								
1)steel work	2	2	3		600	400		4800

2)Casting	3	2	4		600	400		8400
Brick work up to plinth	2	3	4		600	400		6800
Murum filling	2		3	3		400	300	4200
Vibrating	1		0			0		1000
PCC Floor	2	3	4	0	600	400	0	6800
3.Construction of super structure								
Column	6	3	5	0	600	400	0	22800
Brickwork up to lintel	12	3	4	0	600	400	0	40800
Lintel and loft	4	2	3		600	400		9600
Brickwork up to slab	2	3	4		600	400		6800
Beam and Slab								
1)Centring	5	3	4		600	400		17000
2)Steel bending	5	2	4		600	400		14000
3)Casting	1	3	3		600	400		3000
4)lump sum	1							12000
4. Stair case	5	2	3	3	600	400	300	16500
5.Fixing door and windows	10							10000
6.Plumbing								7000
7.Electrification								8000
8.flooring								9600
9.Plastering								
1)External	10	2	4		600	400		28000
2)Internal	8	2	4		600	400		22400
3)ceiling	3	2	3		600	400		7200
10.compound wall	8	2	4		600	400		22400
11.Painting								23000
12.white washing	1		2	2		300	200	1000
	107							34060 0

Table 3- Collected information from construction site of (G+ 3) residences at Gadhinglaj

Type of Work	Time (Day)	No. Labour			Rates Rs./day			
		Mistri	Bigari	Female	Mistri	Bigari	Female	
1.Survey work								
Lineout	2	2	3		500	400		4400
Excavation	6	0	3	0		0	0	30000
2.Construction of Foundation								
Soiling	4	1	5	5	400	350	250	13600
PCC	4	2	4		600	400		11200
Footing 1)Steel bending	6	5	5		600	400		30000
2)Casting	10	2	9	0	500	350	0	41500

Ground Beam								
1)steel work	4	5	5		600	400		20000
2)Casting	5	3	7		600	400		23000
Murum filling	2		4	4		400	300	5600
Vibrating	1		1			3000		3000
PCC Floor	3	2	4	0	600	400	0	8400
3.Construction of super structure								
Column	24	16	44	0	600	400	0	652800
Brickwork up to lintel	28	4	6	4	600	400	250	162400
Lintel and loft	16	3	4		600	400		54400
Brickwork up to slab	15	3	4	4	600	400	250	57000
Beam and Slab								
1)Centring	40	8	14		600	400		416000
2)Steel bending	40	8	14		600	400		416000
3)Casting	4	12	12		600	400		48000
4)lump sum	4							60000
Stair case	20	12	16	12	600	400	300	344000
4.Fixing door and windows	40							300000
5.Plumbing								150000
6.Electrification	40							160000
7.flooring	40							140000
8.Plastering								
1)External	32	4	7		600	400		166000
2)Internal	20	4	7		600	400		104000
3)Ceiling	10	4	7		600	400		52000
9.compound wall	20	3	6		600	400		84000
10.Painting								136000
11.white washing	5		2	2		300	200	5000
	449							37 lac

To reduce the project cost and duration as well as to enhance the quality of work, safety of labors and hence the labor management by optimizing the work and duration for a task

Table 4- Labor and cost required for various work per day

Type of Work	Time (Day)	No. Labour		Rates Rs./day		Amount	Qty. (Brass)
		Mistri	mazdoor	Mistri	mazdoor		
1.survey work							
Lineout							
Excavation	1	0	3.5		400	1300	3.5
2.Construction of Foundation							
PCC	1	2.5	12	600	400	6300	3.53
Footing	1	3.5	15	600	400	8100	3.53
Ground Beam	1	3.5	15	600	400	8100	3.53
Brick work up to plinth	1	8	10	600	400	8800	3.53

Murum filling	1		3		400	1200	3.53
Vibrating	1		1		3000	3000	
PCC Floor	1	2.5	12	600	400	6300	3.53
3.Construction of super structure							
Column	1	12	24	600	400	16800	3.53
Brickwork	1	8	10	600	400	8800	3.53
Lintel and loft	1	3.5	15	600	400	8100	3.53
Beam and Slab	1	12	24	600	400	16800	3.53
Lump sum	1					15000	10
4.Stair case	1	3.5	12	600	400	6600	3.53
5.Fixing door and windows	1					15000	
6.Plumbing						10000	
7.Electrification						10000	
8.flooring	1	1	1	600	400	1000	1.5
9.Plastering							
1)External	1	1.5	3	600	400	2100	1
2)Internal	1	1.5	3	600	400	2100	1
3)ceiling	1	1.5	3	600	400	2100	0.8
10.compound wall	1	8	10	600	400	8800	3.53
11.Painting	1	1.5	2	450	350	1375	10
12.white washing	1	1.5	2	450	350	1375	10

Table 5- Labor and cost required for various work per day as compare to table no. 4

Type of Work	Time (Day)	No. Labour			Rates			Rs	Qty.
		Mistri	Bigari	Female	Mistri	Bigari	Female		
1.Survey work									
Lineout	2	2	2		500	400	3600		
Excavation	2	0	3	3		400	300	4200	
								12 brass	
2.Construction of Foundation									
PCC	2	1	3		600	400	3600	1.6	
Footing	4	3	6		600	400	16800	6.02	
Ground Beam	3	2	4		600	400	8400	3	
Brick work up to plinth	3	2	3		600	400	7200	5	
Murum filling	1		4	4		400	300	2800	
Vibrating	1		1			3000	3000		
PCC Floor	1	4	8	0	600	400	0	5600	
3.Construction of super structure									
Column	5	5	8	0	600	400	0	31000	
								3.83	

Brickwork	16	3	4	4	600	400	300	73000	21.36
Lintel and loft	6	2	3		600	400		14400	2
Beam and Slab									6.3
Centring and steel work	10	5	8		600	400		62000	9.71
Lump sum	2							27000	
4.Stair case	10	3	4	3	600	400	300	44000	
5.Fixing door and windows	10							15000	
6.Plumbing								10000	
7.Electrification								10000	
8.flooring								14500	16
9.Plastering									
1)External	11	3	4		600	400		37400	33
2)Internal	8	3	4		600	400		27200	31
3)ceiling	3	3	4		600	400		10200	16
10.compound wall	4	2	4		600	400		11200	4.60
11.Painting	13	3	4		450	350		35750	64
12.white washing	1		2	2		300	200	1000	
	118								4.78lac

7. Expected Outcome

This project will help for ideal planning of Labor management with respect to health, comfort, safety, convenience and economy. Further factors affected on labors at construction site will be studied and fulfill the requirements of labors.

Following are some recommendations-

In most developing economies there are no programs in place for the training of contractors and most contractors do not have any construction training or background. This is because contracting is yet to be recognized as a profession. Clearly this must change if the construction industry is to play its rightful role in economic development. Training of contractor in sound labor management, clearly spelling out what role it has to play in the efficiency, effectiveness and profitability of the firm must be emphasized.

We in the developing world construction industries must be willing to invest funds in the training our contractors to equip them with various skills necessary for them to play their very significant role in the construction industry. Focusing all our resources in the training of consultants will not yield the desired change in our industry.

8. Facilities available:

- 1) Online journal subscriptions for case study and previous research
- 2) Well equipped computer lab for data collection and analysis.

8. Result-

1) Following are the factors that can be considered for enhancement of labor management

1. Unfair wages
2. Recruitment
3. Poor communications
4. Negative influence factor
5. Lack of motivation
6. Lack of training
7. Lack of investment in research and development

2) Labor management with cost and duration for G+1 residential building

Number of days	146 instead 118
Labor cost	5.99 lakh instead 4.78 lakh

(Note- all the compared labor wages are compared on the basis of daily wages for labor.)

9. References:

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