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Research paper



Factors Affecting Construction Labour Productivity using Questionnaire Survey

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Abstract

Theoretically the most difficult issue in development industry is to enhance the production efficiency. Numerous researches have been done previously, however a more profound comprehension is as yet expected to enhance the labour productivity. The fundamental result from the writing is that there is no standard definition for labour work profitability. It covers the development labour productivity definitions, angles and factors influencing it. The labour productivity is particularly essential in developing countries, where the vast most of the building development work is still on manual premise. The point of this investigation is to get the most recent data and to recognize the key factors that influence the labour work efficiency in and around Thanjavur. So overview is brought out through questionnaire surveys and circulate to respondents who work at different undertakings in wide region in Thanjavur and the poll are evaluated by venture supervisors, project managers, construction engineers, field workers and furthermore with works utilizing their experience. What's more, the information's are gathered and investigated utilizing Relative Important Index (RII) and Importance Index (IMPI) methods, utilizing this the influenced factors are distinguished and positioned, through the vital advances are given to enhance the work efficiency.

Keywords: *Construction work efficiency, Factors influencing labour productivity, Questionnaire review, Improve labour productivity.*

1. Introduction

1.1 General

Construction sector in India is a second largest sector after agriculture over 35 million people were employed in this sector. The commitment of the business to the economy and work is relied upon to develop essentially in the imminent years. However, cost and time overruns are major issues to be dealt in construction. Doloi et al in 2012 have recognized low labour work productivity as a noteworthy purpose behind postponements in Indian development ventures. Construction process is subjected to various unwanted factors which result from many sources. These sources include environmental condition, availability of resources, performance of various parties, contractual relations and involvement of other parties [1]. Productivity has been characterized as the proportion of yields to inputs [2]. Development ventures are generally work based with fundamental hand apparatus and hardware, as work cost involve 30% to half of general undertaking cost. Labour work efficiency is a standout amongst the most imperative factor that influence venture execution in development. In India one of the best difficult looked by the development business is to pull in and to achieve talented work. Cost overruns and schedule delays are some of the major problems caused by labour productivity In order to compete with global economy. The construction industry needs to enhancing the gauges of development particularly work execution.

It is difficult to enhance development profitability among the labourers without recognizing factors that impact efficiency among them. Inefficient organization of development asset can realize low productivity [3]. Subsequently it is basic for specialists, temporary workers and architects to be comfortable with the methods provoking evaluate the productivity of the kinds of rigging and the labourers in various specialties. To achieve the pay expected from any improvement wander by and large, it is indispensable to have an average controlling hand on the efficiency factors that contribute in the incorporated generation structure, similar to work hardware, income.

1.2 Back Ground of Labour Productivity

Productivity can be described from different perspectives. In construction, productivity is ordinarily deciphered as mean labour work profitability, that is, units of work set or conveyed per man-hour. The turnaround of labour work profitability, specialist hours per (unit rate), is also usually used [4]. Productivity is the extent of respect all or a bit of the benefits used to make that yield. Yield can be homogenous or heterogeneous. Profitability is portrayed as the extent of earned hours to honest to genuine hours. It can similarly be portrayed as

Labour Productivity = (Output / Labour Cost).

Two measures of productivity are commonly used as a part of the construction industry. The foremost measure of effectiveness is the total factor productivity (TFP), which is portrayed as the extent of aggregate yield to add up to enter, with the last ordinarily including work, materials, equipment, and capital. TFP is imparted as showed up as

$$TFP = (\text{Total Output}) / \sum (\text{Labour+Material+Equipment+Energy+Capital})$$

The second measure of efficiency is the partial factor productivity (PFP), which is conveyed as the extent of the yields to a solitary

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or chose set of sources of info. A champion among the most normally used PFP measures being developed is labour productivity, which is described as the extent of yield to work include; the yield is evaluated the extent that the sums presented, and work input is assessed as work-hours. In this way, work profitability is communicated as takes after

Labour productivity = (Yield Quantity) / (Work Hours)

1.3 Factors Influencing the Labour Productivity in Construction Industry

Administration controls the majority of the limitations on each of the three classes. The "need to" factors are objectives, which incorporate occupation content, relational environment, remuneration, working conditions, physical capacity, and society. The "know how to" factors are instruction and preparing. The "permit to" factors are association, crude materials, apparatuses, data, and time to act (Mei, 2006).

2. Objectives

The destinations of this study to identify various factors influencing labour work profitability or labour productivity in construction site , prioritizing the important factor and rank the top factors and to suggest plans to overcome the problems.

- Ponder and examine and discuss different factors affecting labour work efficiency in construction industry.
- Breakdown those factors affecting labour productivity using (RII) & (IMPI) techniques.
- To recognize the methodologies for taking care of the issues with respect to delay.
- To make recommendations to improve labour productivity in construction.

3. Methodology

3.1 Construction Site and Participants

Construction site in and around Thanjavur region were selected for the study. Various people involving in construction activities including construction firms, engineers, contractors, site personnel's, labours were selected for this study.

3.2 Data Collection

Questionnaire comprises of different elements influencing labour productivity were made and conveyed more than 50 members out of which I got 30 surveys. The examination of these polls helped us ascertain the Relative Importance Index and Importance Index of every statement.

The information gathered to decide the most powerful factors on venture administration of the task was done through a review by explorative poll to the respondents associated with every day exercises of development firms in different regions in Thanjavur, India. The survey was outlined with the goal that respondents can give the rank to their answers in view of their assessments. The information examination was finished utilizing two strategies to be specific (RELATIVE IMPORTANCE INDEX) technique and (IMPORTANCE INDEX) technique.

4. Data Analysis

Data were collected from different group of the construction people like construction labours, site supervisors, engineering and contractors and analyzed using two techniques mentioned below

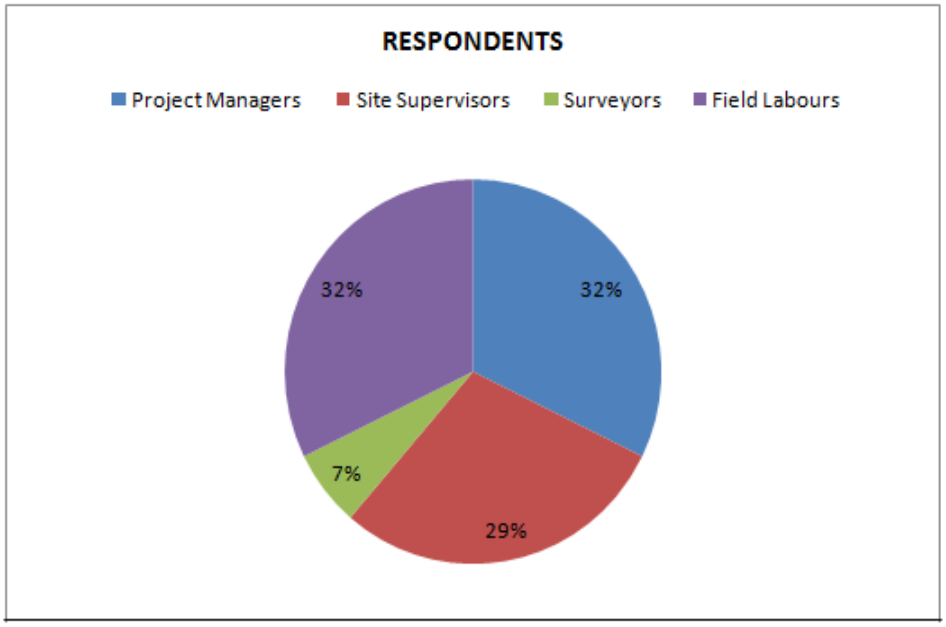

Fig. 1: Respondents Chart

4.1 Relative Importance Index Technique

It is used to choose the relative hugeness of the distinctive conditions and final results of delay. A similar strategy is going to receive in this examination inside different gatherings (i.e. site

supervisor, contractors, project manager, owners). The three-point scale went from 1 (little degree influence) to 3 (high degree influence) is embraced and changed to relative significance lists (RII) for each factor as takes after:

$$RII = \sum P/(Q*R) \quad \ldots (1)$$

Where, P is the weighting given to each factor by the respondents (going from 1 to 3), Q is the highest weight (i.e. 3 for this situation), and R is the total number of respondents. Higher the estimation of RII, more critical was the reason for delays.

4.2 Importance Index

In this procedure, for each reason/factor two inquiries were solicited: What is the frequency of occurrence for this reason? What's more, what is the level of severity of this cause on project delay? Both frequency and severity were ordered on a four-point scale. Frequency of event is sorted as takes after: frequently, now and again and once in a while (on 3 to 1 point scale). Essentially, level of severity was arranged as takes after: outrageous, moderate and little (on 3 to 1 point scale).

Frequency Index

An equation is utilized to rank reasons for delay of frequency of occurrence as distinguished by the members.

$$(F.I.)(\%) = \sum p(r/R) * (100/3) \quad \text{..... (2)}$$

Where, p is the consistent communicating grade given to every response (ranges From 1 for rarely up to 3 for frequently), r is the responses frequency, and R is total responses.

Severity Index

$$(S.I.)(\%) = \sum P(r/R) * (100/3) \quad \text{..... (3)}$$

Importance Index

The significance list of each reason is computed as capacity of both frequency and severity lists, as takes after:

$$IMPI = [F.I. * S.I.]/100 \quad \text{..... (4)}$$

4.3 Relative Importance Index Values

Top 10 factors positioned by Relative Importance Index (RII) method

Table 1: Important reasons for delay by RII technique

No.	Reasons for delay	RII
1	(A) Improper project co-ordination	0.819
2	(B) Delayed material conveyance by the provider	0.694
3	(C) Supervisor or craftsman absenteeism	0.680
4	(D) Unavailability of equipment's/drawings on time at workplace	0.638
5	(E) Poor project planning and scheduling	0.625
6	(F) Lack of supervisor experience	0.597
7	(G) Lack of Periodic gathering among the administration	0.569
8	(H) Poor quality of materials and tools	0.555
9	(I) Harsh weather conditions	0.541
10	(J) Social and public problems	0.527

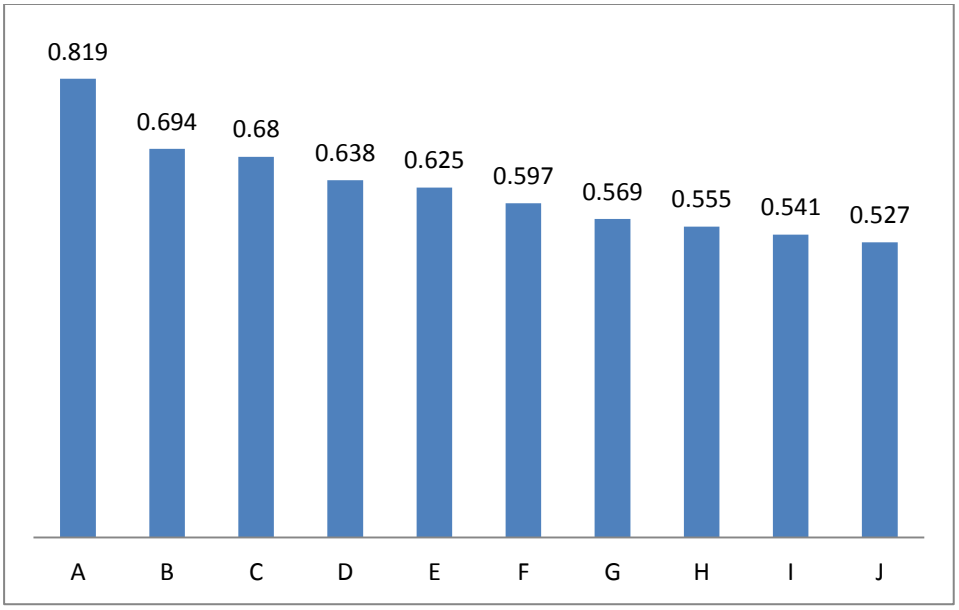

Fig. 2: Critical causes of delay by RII Method

4.4 Importance Index Values

Top 10 factors positioned by Importance Index (IMPI) method

Table 2: Important Reasons for Delay by IMPI Technique

No	Reasons for delay	F.I (%)	S.I (%)	IMPI (%)
1	(A) Lack of adequate instruction provided by supervisors	77	79	60.83
2	(B) Unavailability of materials on time at work place	79	73	57.67
3	I Communication problem among craftsman & supervisors	73.5	78.5	57.47
4	(D) Improper project co-ordination	73.5	78.5	57.47
5	I Poor site management and supervision by contractor	73	76.5	55.85
6	(F) Delayed material delivery by the supplier	75	71	53.25
7	(G) Delay in progress payments by owners	69	77	53.13
8	(H) Personal conflicts among labours	70	75.5	52.85
9	(I) Lack of availability of sanitary facilities in or near the construction sit	69	77	51.27
10	(J) Inappropriate construction methods implemented by contactor	71	73	51.13

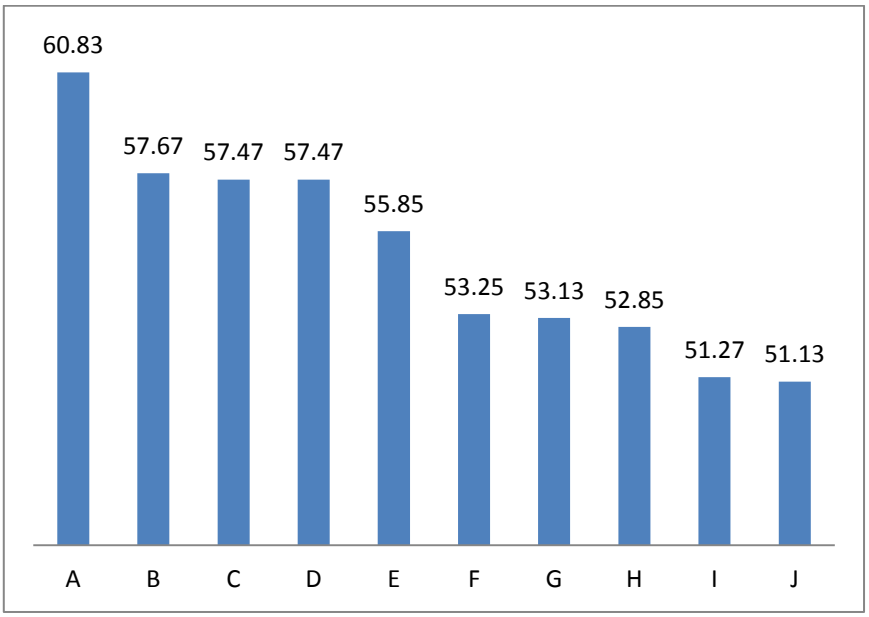

Fig. 3: Critical causes of delay by IMPI Method

5. Results and Discussion

Various factors affecting labour productivity were evaluated and top 10 factors are tabulated the values. In that Relative index results show that improper co-ordination among labours tops the list with rank of 0.819, delayed material. Delayed material conveyance by the provider, supervisors or craftsman non-appearance, inaccessibility of materials and drawing at the opportune time, social and public issues were the other central point recognized in the study. Project management wasteful aspects, for example, improper project coordination and poor undertaking arranging have been seen by project chiefs as essentially disabling profitability. Compared with different respondent's project managers rate these variables to be more extreme. The project manager, in their situation at the bleeding

edge, can understand the effect that poor task arranging and improper co-ordination coordination can have on general project execution. 50% of the project managers showed that despicable project coordination happened with moderate to more frequency in their activities, while half of the undertaking administrators trusted lack of common sense and planning to happen with medium to high frequency in their undertakings. Be that as it may, skilled workers positioned poor project planning and scheduling impressively lower than alternate components with a severity Index of 0.625, Poor project managers and planning was positioned as the most imperative factor influencing development work profitability, thinking about all reactions. 35% of the respondents showed that material inaccessibility was an issue that happened with high to medium recurrence at their development destinations. Material deficiency was distinguished as the most imperative factor affecting efficiency by different researchers [8, 9]. Timely accessibility of drawings has likewise been positioned among the main five variables affecting efficiency.
Importance index results show that Lack of adequate instruction provided by supervisors tops the list with rank of 60.80%, Unavailability of materials on time at work place is also an

important factor that affects labour productivity. One of the leading factors that affectlabour productivity is communication problem between workers and supervisors which ranks third with 57.47%.Improper project coordination among the site personals and labours influence labour productivity in same ratio as of previous one. Delay in progress payments by owners is another important factor to be considered. Lack of availability of sanitary facilities in or near the construction site especially in small projects like construction of residential sites.

6. Conclusion

Delays can be maintained a strategic distance from or limited when their causes are plainly distinguished. The point of this report was to distinguish the postpone factors in development ventures, since delays are thought to be a significant issue in the development business. The paper tended to the most huge factors and gatherings to cause delays.
As per the discoveries above, following focuses can be prescribed in order to limit and control delays in construction projects:

- Advance course of action of equipment's ought to be made or equipment's should buy on lease.
- The quality and experience of work supply can have real effect on the undertakings. Inexperienced work may prompt wasteful work and may cause mischance's amid development.
- Site administration and supervision ought to be made in a right way. Authoritative staff ought to be appointed to make vital game plans to finish the task inside determined time while fulfilling required quality and evaluated cost.
- Endorsement of configuration records ought not to be late, since it could postpone the advance of work. Advance installments ought to be set aside a few minutes to temporary worker to fund the work.
- Proper planning should be made to avoid social factors that may influence construction progress.

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