

Analyzing the Various Factors Affecting Labour Productivity in Construction Industry

Sajitha.P.Raj¹, Remmya C.S², Vishak .M.S³

¹PG Student, Sivaji College of Engineering and Technology, Manivila, Tamil Nadu, INDIA

^{2,3}Assistant Professor, Sivaji College of Engineering and Technology, Manivila, Tamil Nadu, INDIA

ABSTRACT

Productivity is one of the most important issues in both developed and developing countries. The developed countries are aware of the importance of economic growth and social welfare. The developing countries which face unemployment problems, inflation and resource scarcity seek to utilize resources and in such a way as to achieve economic growth and improve citizens lives. The aim of this project work is to identify factors affecting labour productivity and also to study causes i.e. labour problems on site and its effects on the construction projects. Some of the important factors affecting labour productivity are; quality of site management, material shortage, timely payment of wages, labour experience, misunderstandings between labour and superintendent etc. Here problems faced by the labour on Indian construction sites are dealt in detail. Problems like non-availability of proper accommodation, basic amenities, low wages, safety related problems, security etc., exists in almost all Indian construction sites. Analysis of the data collected was done using different statistical methods. This report includes explanations on labour productivity, a case study of residential building construction using Microsoft Project (MSP), productivity improvement using work study, factors affecting labour productivity and the remedies for the same.

Keywords— Economic growth, Labour Productivity, Labour productivity variation, Influenced factors, Social welfare.

construction works are going on. There are more than 20 million of construction workers in India at present. Cities, like Delhi alone have around more than 600 thousand of them. Apart from metros other cities, like Jamnagar in Gujarat, Guwahati & Shillong in the Northeast are also expanding at fast rate.

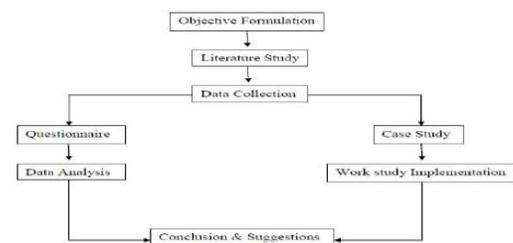
Migration from different states to other states in India has now become so rampant that its impact is felt in every aspect of life. Migration becomes a way of life to many, who are unskilled and semi- skilled and find it difficult to get better jobs within their native and locality. These migrant workers are spread across the width and length of the country. These people in general are nomadic in their life and usually do not return to their birthplace or natives. They travel from one area of work to other area along with their families and live in a place, which is either provided by the owner of the construction company or somewhere near by, building temporary shelters.

They have maximum mobility because of the nature of their work. These labourers are engaged in huge industrial constructions, residential flat constructions, city beautification works. The construction business is booming encouraged by the employment mobility of business class people, blue collar officers, IT employees, students etc. Since need of accommodation is essential, the construction industry is also finding their business growing to peak levels.

I. INTRODUCTION

Modernization and industrialization have helped the construction industry to grow in leaps and bounds. Small towns and cities have become more urbanized and, the construction sector too has got a boost. Irrespective of occasional slumps in the economy or in construction works, the sector is going through a faster growth. Apart from old / traditional urban/ industrial centres, new industrial / urban centres have appeared on the map where

II. METHODOLOGY



III. SITE VISIT

The project site multi-storied building for government school of nursing is located near the general hospital at Thiruvananthapuram.. The project is PWD (Public Work Department), Buildings & local work section VI, South Circle, Thiruvananthapuram. The construction work has been awarded to Jack Constructions, Sasthamangalam for a bid amount of Rs. 3,65,77,302/-.Work on three storied labor complex commenced in March 2011 and was scheduled to be completed by March 2012. The three storied Labor Complex has a floor area of 2177sq. m.

IV. DATA COLLECTION AND ANALYSIS

Responses from questionnaire are then compiled and analyzed. After collecting required number of samples, data analysis is done to arrive at different factors which lower the productivity. These factors are then analyzed to find its effect on different aspects of the project using different statistical method which is specified on next phase. The case study of a residential project construction was done. This study covers review of the labour productivity and the causes for poor productivity. The details of different activities were obtained from different sources and from which the conclusions are drawn on the productivity levels and the causes, of the poor productivity.

Field data were collected from construction sites with a view to understand the real time difficulties in achieving higher construction labor productivity. Random sampling was done in the construction sites. Medium to large firms were contacted for the survey. The data has been collected using three different surveys to gather information. First two surveys were carried out to gather all the required information from the sites. In the course of the research, it was felt that one more survey is required to know contractors view on different factors affecting labor productivity. Hence a third survey was carried out to know contractors opinion to improve productivity.

Survey 1:Questionnaire for employer of construction workers.

Survey 2:Questionnaire for construction workers.

Survey 2:Preference analysis survey.

V. ANALYSIS OF SURVEY 1

The information obtained from survey 1 is shown in Figure

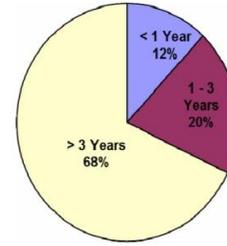


Figure 1 : Project Duration

From the survey it is found that 68% projects are more than 3years duration, 28% are in between 1- 3 years and remaining 12% are less than one year.

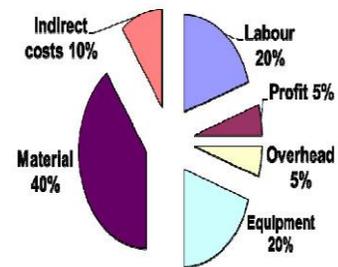


Figure 2 : Project Cost Break-up

Figure 2 shows the entire project cost break up

- Materials - 40%
- Labor - 20%
- Equipment - 20%
- Profit - 05%
- Indirect - 10%
- Overhead - 05%

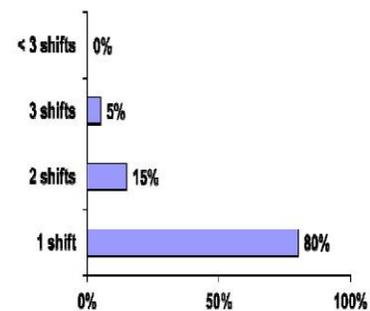


Figure 3 :Work Shift

This reveals that the predominant use of labour prevails on Indian construction sites. Labour component in Indian scenario seems to be higher than labour component in foreign countries. Hence, labour cost saving can improve a huge profit. Figure 3 shows that 15% labors are company employed, 55% sub contracted, and 30% are

independent labor. As departmental labour is least, labourers do not feel like working for their own organization which contributes in lowering labour's productivity.

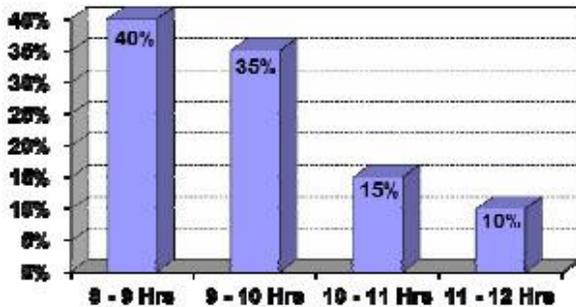


Figure 4 : Duration of Work Shift

40% sites work 8-9 hours/day, 35% work 9-10 hours/day, 15% for 10-11 hours/day, rest of them work 11-12 hours/day. From figure 4 it is clearly established that more than 50% labors work for more than 10 hours a day which tends to reduce productivity.

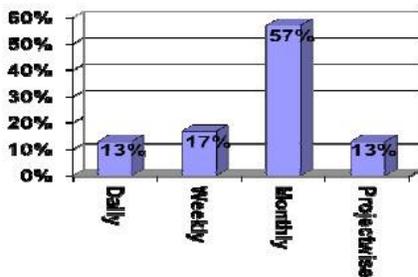


Figure 5 : Wage Cycle

Figure 5 suggests that 57% contractors pay wages on monthly basis, 17% weekly, 13% pay project wise, 13% pay on daily basis. When the same was asked to labourers they say that wages are not paid regularly. Hence, labour's are not able to plan and utilize their earnings in efficient manner.



Figure 6 : Planning for more mechanization

72% are planning to go for more mechanized work while 28% are satisfied with current work. This can be directly related to Figure 6. As employers are not satisfied with labour productivity they tend to go for more mechanized work.

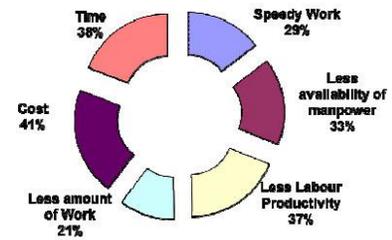


Figure 7 ; Reasons for Replacement of Labour with Equipment

Figure 7 shows reasons and number of respondents to that particular reason to go for mechanized work.

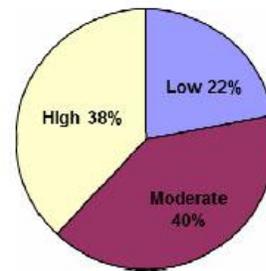


Figure 8 : Difficulty in Handling Labour

Figure 8 shows that 38% of contractors find high difficulty in handling labor, 40% of contractors find it moderate and 22% find it less difficult in handling the labour. A majority of sample found handling labour on site difficult.

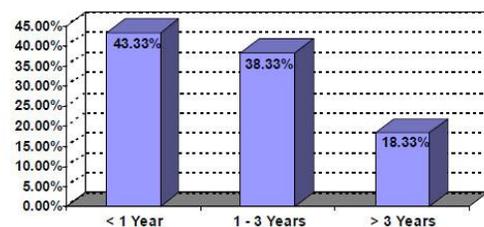


Figure 9 : Continuity of Labour Working for an Organization

43% of labor work less than a year for a particular organization, 39% work for 1-3years and whereas 18 % work for more than 3 years. 68% projects

are greater than 3 years in duration but as shown in Figure 9 labour working greater than 3 years on a particular organization is only 18%, this results in huge continuity problems.

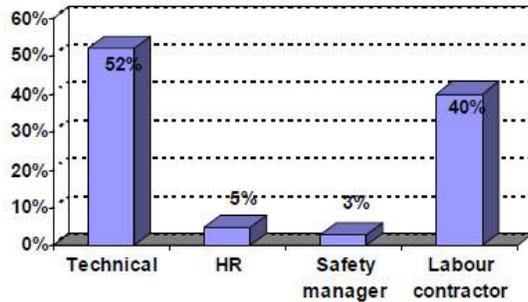


Figure 10 : Personnel to take care of Labour

52% labor are taken care by technical staff, 40% by labor contractor, 5% by HR, 3% by safety managers. Figure 10 implies that in majority of sites there are no human resource managers and safety managers to take care of labourers and hence the labour contractors can easily exploit the situation of laborers.

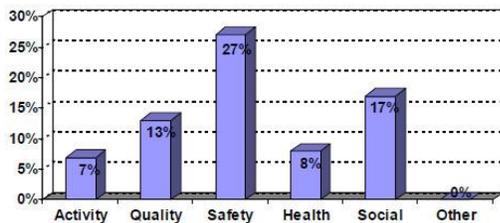


Figure 11 : Training given to Labourers

27% contractors provide training on safety, 17% on quality, 8% on health, 13% on social awareness, 7% on activities which is shown in Figure 11 .

VI ANALYSIS AND INFERENCES TO SURVEY 2

From the survey following information was obtained. Figure 12 shows that labor sample consists of 71% males and 29% females

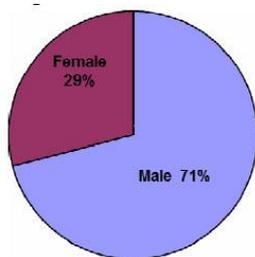


Figure 12 : Gender Ratio

Sample comprised of 8.5% below 18 age group, 38.5% between 18-30, 34.5% between 30-50 and 18.5% above 50. Figure 13 shows that labour in the bracket of 18 to 30 years of age can work harder as compared to other labour. Similarly labour with age between 30 to 50 years are having experience in the field so they can work making less mistakes and also can suggest solution to some of the onsite problems. Labour with more than 50 years generally work as mason coordinating work with younger labour.

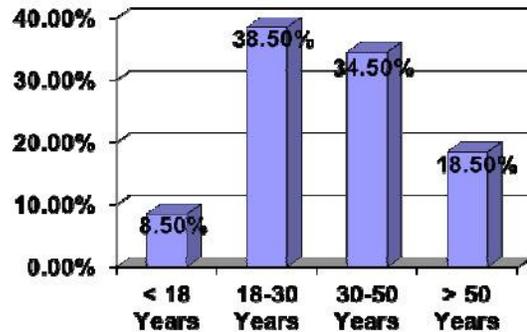


Figure 13 : Age Breakup

30% of the labour has been working in construction industry from last 2 to 5 years where as 24%, 21%, 18% and 7% of labour are working from last 5 to 10 years, 1 to 2 years, less than 1 year and more than 10 years respectively. Work experience always help person to do work more efficiently and can find solutions to the problems. From Figure 14 we could conclude that majority of labour are having work experience more than 5 years. Still they are not grown much in the responsibility that they have to carry. This is just because they inculcate informality while working on sites.



Figure 14 : Working Experience

Figure 15 suggests that most of the labours have worked in more than one city. Hence, they have to travel a lot to get their employment. Labour require more holidays to visit their home and they do not come back till enough

money is given to them to come back again. And hence, migration reduces productivity.

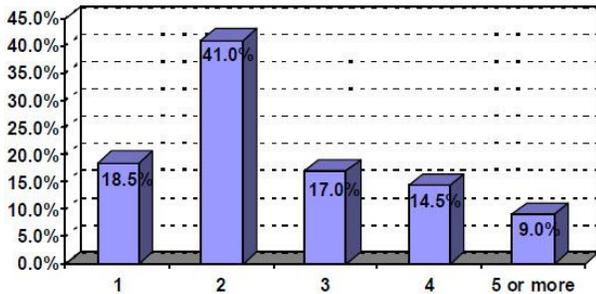


Figure 15 : Cities Traveled

49% of labour have farming as their primary profession, 9% were working in some factories, 4% had their primary profession of gardener, store keeper, household servant etc. whereas 38% of labour are working in construction industry from the beginning of their careers. From Figure 16 it could be learnt that labour with their primary profession of farming go to their farms during required season even without taking permission and then it is very difficult to get them back to work.

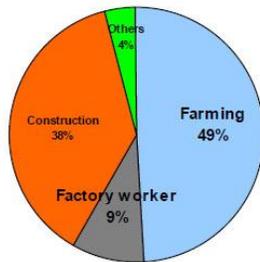


Figure 16 : Primary Profession

From Figure 17 it is seen that 53% of the labour are not satisfied with their current profession i.e. construction work. Whereas 47% of them find it satisfactory to work in construction field. Poor satisfaction leads to low productivity.

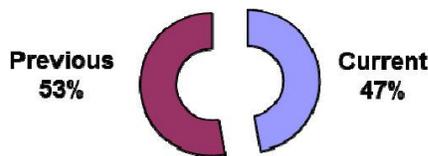


Figure 17 : Satisfactory Profession

Figure 18 shows that only 17% of Labourers have got some training before starting the work. If proper training is provided to workers, they can work efficiently which increases their productivity

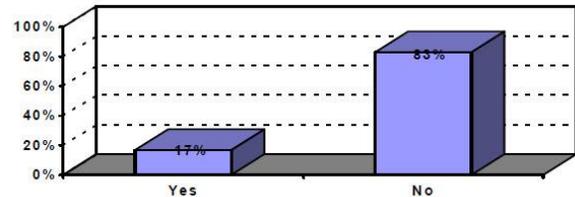


Figure 18 : Training Given

Figure 19 shows that 35.5% of the labourers have learned the work from their friends, 24% of them have learned from their parents, 26% of them have learned from where they work and 14.5% of them have learned from relatives.

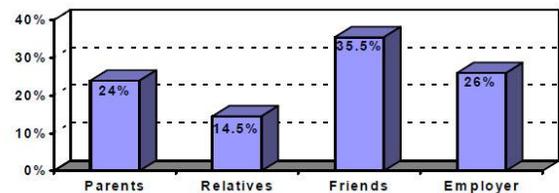


Figure 19 : Learning Source

In the sample collected there are 54% skilled labour, 13% semi-skilled and 33% are unskilled labour as shown in Figure 20.

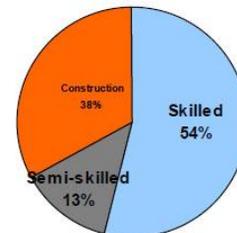


Figure 20 : Type of Labour

60.5% of labourers are working for 11-12 hrs in a day, 17% for 9-10 hrs, 14% for 8-9 hrs and 8.5% for 10-11 hrs a day. If we compare this data from Figure 21 with employers data, the information is contradictory. More than 60% labour says they work for 11 to 12 hrs a day whereas the employers say that the maximum labour is working only 8-9 hrs a day.

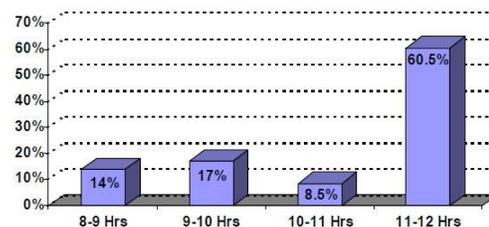


Figure 21 : Working Hours

Figure 22 shows that labour are most productive in first 2 to 3 hours in the morning followed by night hours.

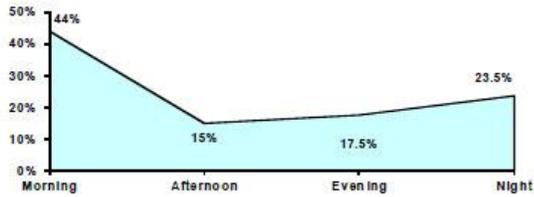


Figure 22: Most Productive Time

Figure 23 shows that 46% labourers have to work overtime 3-4 days in a week, 23.5% for 1-2 days and 15% for 5-6 days.

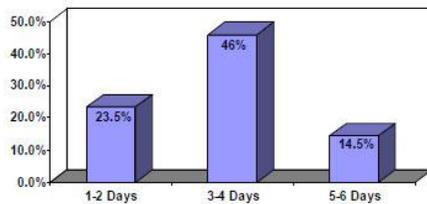


Figure 23 : Overtime

Figure 24 shows that 60% labourers take tea break more than 6 times in a day, 25% between 3-6 times and 15% less than 3 times a day. Hence most of the labour requires around 5 to 6 breaks a day while working. If we assume around 10 to 12 minutes for each break, total break time will come out to be 1 hour. If we add this time to recess time, total off time will come around 2 hours.

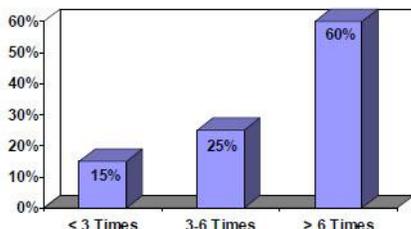


Figure 24: Number of Breaks

V. CONCLUSION

Construction labourers are migratory in nature and therefore geographically mobile searching for employment, because of which it is not possible for both the parties (construction labourers and employers) to develop long-term relationships and loyalty. It also affects the seriousness with which they approach their work which is the major prerequisite for high productivity. Also most of the construction labour is also engaged in some other profession like farms, factory, domestic servant etc. and

hence they do not give full importance to construction work and tend to work informally. Due to this labour cultivates informality, and informality lowers productivity growth. Preference analysis survey reveals that technical, social, physical, psychological, economic, and security problems lowers labour productivity on the construction sites.

The case study suggests that differences in the marginal labour productivity cause large output losses. From survey it is found that employers of construction labour do not consider their labour as their employees. Profit margin is only the criteria for many of the construction firms and hence construction firms engage little in technology adoption, have high labour turnover and do not invest in training workers. Most of the firms do not find it reasonable as most of the labour on the sites are project specific or even activity specific. Hence, Indian construction industry is facing problems of improper handling and inefficient utilization of resources like material and equipment's which reduces profitability due to low and decreasing labour productivity. Following are the suggestions drawn out from the study to improve labour productivity:

REFERENCES

- [1] Shashank K1, Dr. Sutapa Hazra2, Kabindra Nath Pal3. "Analysis of key factors affecting the variation of labour productivity in construction projects" *International Journal of Emerging Technology and Advanced Engineering*.
- [2] Mr.C.Thiyagu(Student)1, Mr.M.Dheenadhayalan (Guide)2 "Construction labor productivity and its improvement" *International Research Journal of Engineering and Technology (IRJET)*
- [3] Anu V. Thomas and J. Sudhakumar "Factors influencing construction labour productivity: an indian case study" *Journal of construction in developing countries*, 19(1), 53-68, 2014
- [4] Vaishant Gupta1, R. Kansal2 "Improvement of construction labor productivity in chambal region" *International Journal of Research in Engineering and Technology (IJRET)*.
- [5] X. S. Sharmila1, K.Nirmalkumar2 "Study on the critical factors influencing labor productivity in construction industry" *International Journal of Innovative Research in Science, Engineering and Technology*.