Abstract—Productivity plays an important role in the construction industry. Productivity is one of the most important issues in both developed and developing countries. Construction projects are influenced/affected by various problems such as cost, duration, quality, safety, etc. The main objective is to study about various factors influencing labor productivity in construction project. In the timeline of research regarding labor productivity there are many studies available in which the factors were identified from the managers perspectives. This project contains a set of questions to conduct a questionnaire survey. The questionnaires will be distributed to Project Manager, Project Engineer, Architecture, planner, quantity surveyor, etc. of various construction companies. Once the companies replies to the questionnaires, all the obtained information are sorted and analyzed. Based on the replies of each company necessary guidelines to improve labor productivity in construction are to be framed.

Key words — Construction, Labour, Manpower, Material, Productivity

I. INTRODUCTION

Several studies related to labour productivity are performed for construction industry in past. Several of them were related to calculating the effect of productivity factors. Measureable calculations about the effects of those factors are required for several purposes, it includes estimation of the construction project, it’s planning and scheduling. However, past study shows that it is tough to calculate such an impact, and at present there are no universally accepted standards to measure factors causing labour productivity loss in construction industry.

Achieving better labour productivity requires detailed studies of the actual labour cost. Various labours have different variables affecting their productivity levels. For every project, productivity, cost, quality, and time have been the main concern. Better productivity can be achieved if project management includes the skills of education and training, the work method, personal health, motivational factors, the type of tools, machines, required equipment and materials, personal skills, the workload to be executed, expected work quality, work location, the type of work to be done, and supervisory personnel.

In today’s era, one of the biggest concerns for any organization is to improve their productivity, representing the effective and efficient conversion of resources into marketable products and determining business profitability. Consequently, considerable effort has been directed to understand the productivity concept with different approaches taken by researchers, resulting in a wide variety of productivity definitions.

II. REVIEW OF LITERATURE

1. DEFINITION

The term “productivity” expresses the relationship between outputs and inputs. Output and input differ from one industry to another. Also, the productivity definition varies when applied to different areas of the same industry. Labour is one of the basic requirements in the construction industry. Labour productivity usually relates manpower in terms of labour cost to the quantity of outputs produced. In other words, the definition of labour productivity is the amount of goods and services produced by a productive factor (manpower) in the unit of time.

Labour Productivity = Labour cost / work hour Output

2. SIGNIFICANCE

Productivity has a great significance in construction. Labour productivity constitutes a significant part of production input for construction projects. In the construction industry, many external and internal factors are never constant and are difficult to anticipate. This factor leads to a continuous variation in labour productivity. It is necessary to make sure that a reduction in productivity does not affect the plan and schedule of the work and does not cause delays. The consequences of these delays could result in serious money losses. Further, considerable cost can be saved if productivity is improved because the same work can be done with less manpower, thus reducing overall labour cost.

3. OBJECTIVE

The objective of this study focuses on views from the construction industry about various factors influencing labor productivity, analyzes factors affecting the labor productivity impact, and suggests appropriate measures that can be taken to improve labor productivity. The aim is supported by the objective are study and discuss various factors influencing labor productivity in construction industry, statistically analyze the factors affecting labor productivity, recommendations to improve labor productivity in construction.

4. BACKGROUND PRODUCTIVITY

Mr. A.A. Attar, Prof. A.K. Gupta & Prof. D.B. Desai stated that poor productivity of construction workers is one of the causes of cost and time overruns in construction projects and
A. Soekiman, K.S. Pribadi, B.W. Soemardi, R.D. Wirahadikusumah stated that the construction industry faces challenges with regard to problems associated with productivity and the problems are usually associated with the performance of labour. The performance of labour is influenced by many factors and is usually linked to the performance of time, cost, and quality.

Adnan Enshassi, Sherif Mohamed and Saleh Abushaban stated that the most important factors influencing project performance are: delays because of borders/roads closure leading to materials shortage, unavailability of resources, low level of project leadership skills, escalation of material prices, unavailability of highly experienced and qualified personnel, and poor quality of available equipment and raw materials.

Adnan Enshassi, Sherif Mohamed, Ziad Abu Mustafa & Peter Eduard Mayer in that survey indicated the main factors negatively influencing labour productivity are: material shortage, lack of labour experience, lack of labour surveillance, misunderstandings between labour and management, and drawings and specification alteration during execution.

T.G. Shree Raja Gopal and Dr. K. Murali stated that supervision, skill of labour, tools and equipment, absenteeism and financial constraints were the most significant factors influencing labour productivity and Arun Makulawatudom and Margaret Emsley indicated that the top eight factors influencing construction productivity are: lack of material, incomplete drawings, inspection delay, incompetent supervisors, instruction time, lack of tools and equipment, poor communication and poor site conditions.

Ponnettekasemant. P and Charoenpornpattana. S stated that the five highest ranking factors influencing labour productivity were absenteeism of worker, labour skill and experience, financial shortage, inspection and instruction delay, incomplete drawings.

In these past studies shows the number of factors influencing productivity, there are still anonymous factors need to be further study even in developing and developed countries. Their study identified different factors influencing labor productivity and grouped them according to their characteristics such as, design, execution plan, material, equipment, labor, health and safety, supervision, working time, project factor, quality, leadership and coordination, organization, owner/consultant, and external factors.

IV DIFFERENT FACTORS INFLUENCE LABOUR PRODUCTIVITY

1. Time
During construction projects, there are many tasks which causes a loss of productivity. Past study shows productivity decreases with working overtime. The most frequently stated reasons are increased absenteeism, reduced supervision effectiveness, poor workmanship, resulting in higher rework, increased accidents. Working overtime initially result in increased output, but continuing overtime may lead to increased costs and reduced productivity.

2. Quality
Inefficiency of equipment and poor quality of the raw material are factors which cause low productivity. The productivity rate of inefficient equipment is low. Old equipment is subject to a great number of breakdowns, and it takes a long time for the labourers to complete the work, thus reducing productivity. Poor-quality material used for work is the other factor because poor materials generally lead to unsatisfactory work and can be rejected by supervisors, thus reducing the productivity.

3. Safety
Accidents have high impacts on labour productivity. Various accident types occur at the site, such as an accident causing death and resulting in a total work stoppage for a number of days. An accident that causes an injured person to be hospitalized results in a work decrease of the crew for which the injured employee worked. Small accidents resulting from nails and steel wires can stop work and decrease productivity.

4. Managerial Factors
Managers skill and attitudes have a crucial bearing on productivity. In many organizations, productivity is low even though the latest technology and trained manpower are made available. Low productivity is because of inefficient and indifferent management. Experienced and committed managers can obtain surprising results from average people. Employees job performance depends on their ability and willingness to work.

5. Experience of Labour
Literature shows that a lack of labour experience is the factor which negatively affects labour productivity and proves that, to achieve good productivity, labour plays a significant role. Contractors should have sufficiently skilled labourers employed to be productive. If skilled labour is unavailable and a contractor is required to complete specific task with less-skilled labour, it is possible that productivity will be affected.

6. Type of Project
To accomplish substantial productivity, every member of a crew requires adequate space to perform task without being affected with/by the other crew members. When more labourers are allotted to perform particular task, in a fixed amount of space, it is probable that interference may occur, thus decreasing productivity. Additionally, when multiple trades are assigned to work in the same area, the probability of interference rises and productivity may be reduced. Interference among the various crews and labourers is due to mismanagement on construction sites.

7. Misunderstanding
Misunderstanding among labourers creates disagreements about responsibilities and the work bounds of each labourer, which leads to a lot of work mistakes and decreases labour productivity. Lack of compensation and increased labourer age negatively affect labour productivity because labour speed, agility, and strength decline over time and reduce productivity.

8. External Factors
Weather conditions are significant factor to consider for completion of any construction project. Adverse winter weather, such as winds and rains, reduces productivity, particularly for external work such as formwork, T-shape
work, concrete casting, external plastering, external painting, and external tiling.

9. Motivation

Motivation is one of the important factor affecting construction labour productivity. Motivation can be best accomplished when labours personal ambitions are similar to those of the company. Factors such as payment delays, a lack of a financial motivation system and non-provision of proper transportation.

10. Material/Tools

Material management is one of the most important factor in construction industry. Productivity can be affected if required materials, tools, or construction equipment for the specific are not available at the correct location and time. Selection of the appropriate type and size of construction equipment often affects the required amount of time.

11. Natural Factors

Various natural factors affecting labor productivity collected from previous study are weather conditions of the job-site and geographical conditions. Others factors such as fuel, water, and minerals also affect productivity to certain extent.

V RESEARCH METHODOLOGY

Questionnaire survey was carried out among the various construction professionals. The Questionnaire consists set of questions targeting the factors affecting labor productivity in the four different groups that is management group, technological group, human/labor group and external group. The responses were to be based on the understanding, knowledge and experience of the respondents and not related to any particular project. The set of questions sent to the project managers, project engineers, quantity surveyors, site engineers of various construction.

VI CONCLUSION

After receiving all the questionnaire, the data can be analyzed by the relative importance index. By finding the most factors influencing labor productivity then to derive the suitable model to improve the labor productivity.

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