

# Analysis On Factors Influencing Productivity Of Construction Workers In Surabaya

Diah Ayu Restuti Wulandari\*

*\* Department of Civil Engineering, Narotama University, Indonesia*

---

## Abstract

Manpower productivity is an interesting subject of research and constituting a dominant issue in the sector of construction industry, since it is deemed as one of the best indicators of efficiency in productivity. High level of productivity is usually inferred as an excellent profitability. The aim of this research is to identify and to analyse the factors influencing productivity of construction workers in Surabaya. Population of research consist of the staff of construction works, starting from technical staff, engineer up to those in managerial level. Samples of the research at the amount of 36 respondents and this data is analysed by factor analysis methods. Based on the outputs of aforesaid factor analysis, three groups of factors are found influencing productivity of the construction workers in Surabaya, namely management factor, environmental envelope or work environmental factor, and motivation factor. It is also expected that in further research, the other models of human resources development are made with the hope that they can improve productivity of the construction workers

© 2015 The Authors. Published by Narotama University Press.

Peer-review under responsibility of organizing committee of The Narotama International Conference on Civil Engineering 2015 (NICCE-2015).

*Keywords: Construction Workers, Excellent productivity, Manpower*

---

## 1. Introduction

As other major cities, Surabaya became the foundation for the workers of the towns in the vicinity. In general, they work in the informal sector, including as workers in the construction industry. However, the average skilled construction workers in Surabaya are still lacking. The skills of workers in general are based only on work experience, not because from formal education, training and most of the skills acquired from generations of their predecessor. Most groups of the workers in the project came from the same village or nearby. While experts were hired to come from outside the city, such as Madiun, Blitar, Lumajang, Pasuruan and other areas are still included East Java. Where elections are usually carried out by a labor foreman based on relationships and less attention to the skill factor in detail (Andi et al, 2004).

This will obviously lead to the quality of building performance. Empirical data shows that the age of the building often does not correspond to the initial classification. As an example of the collapse of the building of SDN Kalisari II Surabaya which is still under construction. On the other hand, construction companies often do not provide comfort and safety for workers. This is shown in the data number of work accidents is very high (8 accidents during January to March 2010) on the construction of apartments Puncak Permai (Wicaksono and Singgih, 2011). Besides the pressure at work can cause health problems, which in turn will affect work performance (Siagian, 2002).

Under the pressure of the problems and challenges of everyday life, many construction projects that respond to the problems of workers with only pay attention to the urgent issue alone. So as to improve the productivity of workers, must first know what factors were most responsible for affecting the productivity of the workers. These factors are very diverse, both derived from the workers, management and the project environment. All of these must be considered in order to create

---

\* Corresponding author. Tel.: +62-821-4336-5350  
E-mail address: dee.ayu86@gmail.com

a conducive working environment so that employees can maximally improve its performance. Based on the description above, this study is to identify and analyze the factors that influence the productivity of construction workers in Surabaya viewed from the standpoint of construction workers staff.

### *1.1 Statement of the Problem*

Construction productivity is influenced by many factors other than human labor, including materials, supplies, equipment, construction methods and management skills. However, these resources are dead and meaningless if it does not turn into a productive tool by the human element (Zakeri et al., 1997). In organizing a construction project, one of the resources that the determining factor of success is labor. Because of the type and intensity of activity changed rapidly throughout the project cycle, the supply amount of power, the kind of skills and expertise should follow the changing demands of ongoing activity (Soeharto, 1995).

This further confirms that the human factor be decisive to achieve specified levels of productivity. According Ervianto (2004) without prejudice to the role of other factors, tukanglah as a determinant of the overall performance of the project team. Construction projects always require physical labor by using them to work in an open field in the weather and conditions. To obtain the desired levels of productivity and minimize all possible risks as well as the safety and health of workers, leaders must understand the capabilities and limitations caused by the condition of the project site

Further ervianto (2004) stated that without knowing the real situation in the field, it's hard to plan the leadership of productivity improvement program. Thus the need for the initial measurement of productivity that occurs at the project site. From these results then be evaluated by comparing what happens with what is supposed to happen. The evaluation results can then be reused to plan the level of productivity to be achieved with the course lead to the improvement of what has happened. Therefore in this study will discuss the construction worker productivity assessed from the project manager, site engineer, and so on that are in the field.

## **2. Literature Review**

Productivity is one of the most important factors in influencing the overall performance of an organization, both large and small. At the micro level, productivity lowers the cost of repairing the unit and serves as an indicator of project performance. Meanwhile at the macro level increased productivity is a vital tool in the fight against the effects of inflation and determining wage policy, in addition to reducing the total cost of the project duration and quality improvement (Kazaz and Ulubeyli, 2007).

While the general human resources is an important element in the world of production, and serves as a liaison between all inputs so as expected. Human resources are recognized as the most important resource in a strategy to increase the productivity and competitiveness of the industry the company. foreman-worker employment relationship, the relationship between workers, absenteeism. Several approaches will be discussed in next chapter.

### *2.1 Approach Factors Affecting Productivity of Construction Worker*

Concept of productivity is not new and has existed for a long time. It has been applied in many circumstances at various levels of aggregation in the past two Centuries. Several studies of these factors, among others carried out in Singapore by Low in 1992 quoted from Nugroho (2012). Low conclude that productivity is affected by the construction of seven factors, namely buildability, structure of industry, training, mechanization and automation, foreign labor, Standardisation, building control. in Indonesia also conducted similar studies are factors that affect the productivity of the project by kaming et al, 1997 where these factors are classified into four main categories including factors first is the method and technology which are included in this factor that is setting working order, method of construction and work measurement, then for the second factor is the

working environment factors which also includes safety and job security, and the quality of supervision.

Furthermore, to factor all three have in common with Kazaz and ulubeyli (2004) which is reviewing the human factor in terms of labor costs and to factor the latter is a factor of field management which includes planning and scheduling, the layout of the field, field communication, materials management, equipment management, workforce management. Factor in line with the conclusions of researchers including ovarian (2001), borchherding et. Al (1986) Thomas and napolitan (1995) and enshassi et.al (2006), where the presence of good scheduling changes regarding delays in projects such as the dismissal of temporary workers due to lack of availability of production resources and accelerate a project activity which may result in overtime or work overtime field workers. If left drawn - will be a negative effect on the level of labor productivity in the field. Many factors that have the potential to affect worker productivity. Among these factors, there is anecdotal evidence that these two factors, namely the economic and socio-psychology is often mentioned by workers themselves as the most relevant (and Aramvareekul Rojas, 2003).

## 2.2 Conceptual Framework

Given the cultural differences and certain demographic variables it can not be used as a theory, so as to develop these variables, the need for previous explorative study that will be analyzed using factor analysis. While the similarities of the five previous studies by research investigators are equally motivated by unemployment, inflation and scarcity of human resources in developing countries. Research by title analysis of the factors affecting the productivity of construction in Surabaya was developed to identify and analyze the factors that affect the productivity of construction workers in Surabaya. For details on each research concept models, either by previous researchers and research investigators.

Based on the review of this paper from the aforementioned past studies the proposed conceptual frame work is a shown in Fig. 1.

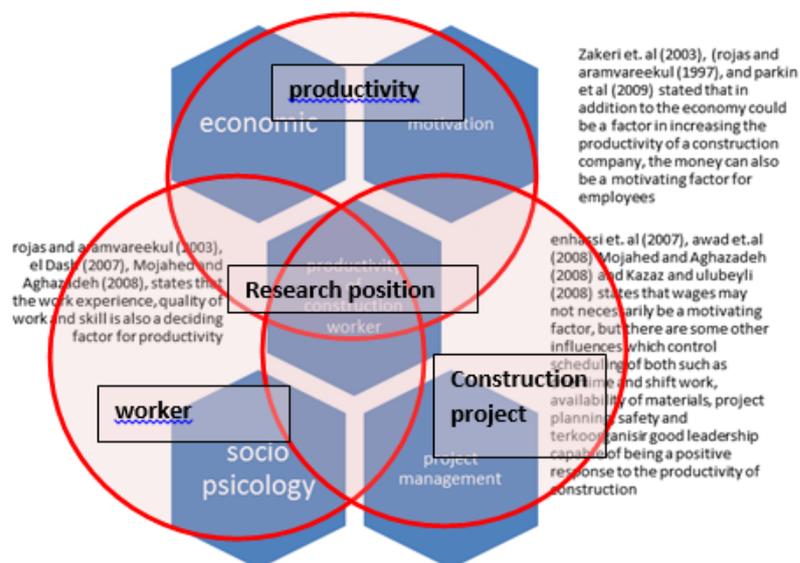


Fig. 1 Research position

## 3. Methodology

The aim of this research is to identify and to analyse the factors influencing productivity of construction workers in Surabaya. Population of research consist of the staff of construction works,

starting site engineer up to those in project manager yang berada dilapangan. Samples of the research at the amount of 36 respondents and this data is analysed by factor analysis methods.

**4. Data Factorial Analysis**

The main purpose of factor analysis is to define a data structure metrics and analyzing the structure of the mutual relationship (correlation) between the large number of variables (test scores, test item, questionnaire answers) by defining a set of similarity variables or dimensions and is often called the factor (Ghozali, 2009) , analysis of factors used if we have a lot of variables in the data group and aims to reduce the number of variables to be easily set (manageable), in other words, factor analysis is used as a tool to reduce the data that is not excessive, simplifying data and facilitate for making clear conclusions and do not doubt.

*4.1 Inspection on KMO and Bartlett's*

Validity is the accuracy results of the measurement, is the measurement tool' accuracy test. The higher of the survey validity is, which indicated that the more content to show of the measurement results that the true measure of its features is seeking According to Kaiser (1974), the KMO value above 0.9, is perfect; The KMO value between 0.8 - 0.9, is very suitable; KMO value between 0.7 - 0.8, suitable; The KMO value between 0.6 - 0.7, is not too suitable; The KMO value between 0.5 - 0.6, is very reluctant; The KMO value below 0.5, is unsuitable. According to Inspection on KMO and Bartlett, the date of KMO is 0.753, Bartlett's value is 525.660, the degree-of-freedom (df) is 190, and the significance probability is 0.000, which is smaller than 1%, and achieves the remarkable level. The above result indicated that the KMO sample measure result is remarkable, and the data's related is not the unit matrix, the sampled data suitable to make the factorial analysis.

*4.2 Factorial Analysis*

After doing a few times reduction, the figure KMO and Bartlett's test of 0.788 with 0.000 significance. Table KMO and test Barlett's can be found in Appendix 4. From the table rotated component matrix in Appendix 4 is seen that after the reduction process, 12 variables the rest clumped into three factors where the first factor is able to explain 42.718% of the variation, the second factor is able to explain 15.595% of the variation, and the third factor is able to explain 11.438% of the variation. The factor rotated loading matrix has shown in Table 1.

**Table 1.** The rotated factor loading matrix

NO	Factor	NILAI MSA	KET	
1	First	Communication	.881	F11
		Increasing coordination	.840	F12
		Increasing coordination and the sense of responsibility of each worker	.806	F13
2	second	The level of difficulty in work	.773	F5
		Overtime	.766	F10
		Health and safety conditions in workplace	.667	F8
		Field conditions	.596	F6
		Work discipline	.586	F7
		Distribution of materials needed at the project site	.538	F9
		Work experience	.527	F25
3	third	the suitability of the amount of wages	.883	F2
		timely payment of wages	.865	F1

The data in table 1 shows the factor loadings in each factor between 0,527 – 0,883 in other latitude's load value, which explains the good degree of differences factor and convergen validity. F11, F12, and F13 these factor are mainly influencing factor of the communication, and the content of the system's formulation should be communication, increasing coordination and the sense of responsibility of each worker to work. The three dimensions of factor have larger proportion in the principal components which can be called management factor by improving communication

between field project managers, foremen and workers can improve the confidence of workers so as to improve productivity F5, F10, F8, F6, F7, F9 and F25, the factor which influencing factor of the level of difficulty in work , overtime , health and safety conditions in the workplace , field conditions ( shape , size , type of soil , site conditions and surroundings , and weather ) , work discipline , distribution of materials needed at the project site , work experience. The seven dimensions of factor have larger proportion in the five dimensions of factor have larger proportion in the second principal components which called work environmental factor . F2 and F1 these factor could be the suitability of the amount of wages and timely payment of wages. The components which can be called motivation factor. We have extracted three main principal components from the survey data analysis of the large scale in productivity for construction worker.

## 5. Conclusion

Based on the results of data analysis and discussions can be concluded that the initial thirty variables that affect the productivity of construction workers in Surabaya can be reduced to twelve variables can then be grouped into three factors. The first factor consists of three variables, namely: communication, improved coordination between site engineer until a project manager with his foreman and worker, and a sense of responsibility towards his job. These three variables can be grouped into factors of communication and coordination, able to give 42.7% influence on the productivity of workers. The second factor consists of seven variables: the level of difficulty in work, overtime, security and safety, field conditions, discipline, distribution of material and work experience of seven variables can be grouped into the envelop environmental factors and is able to make an impact on the productivity of 15.6% workers. The third factor is composed of two variables: the suitability of the amount of wages and timely payment of wages. Both of these variables can be grouped into the motivational factors and are able to give 11.4% influence on the productivity of workers.

## 6. References

- [1] Ailabouni, N., K. Gidado, and N. Painting. 2002. Factor Affecting Employee Productivity in the UAE Construction Industry, Academia.edu.
- [2] Andi, D. Djendoko. 2004. Motivasi Pekerja Pada Beberapa Proyek Konstruksi di Surabaya. Journal of Civil Engineering Dimension, Vol. 6, No. 2, 80-87, September 2004
- [3] ASI. <http://www.ssk.gov.tr>: Official web site of Association of Social Insurances, 2005.
- [4] Awad, H.S., C. Chang., K.T. Sullivan., and J.A. Lackney. 2008. Impact of Shift Work on Labor Productivity for Labor Intensive Contractor. Journal of Construction Engineering and Management.

This page is intentionally left blank