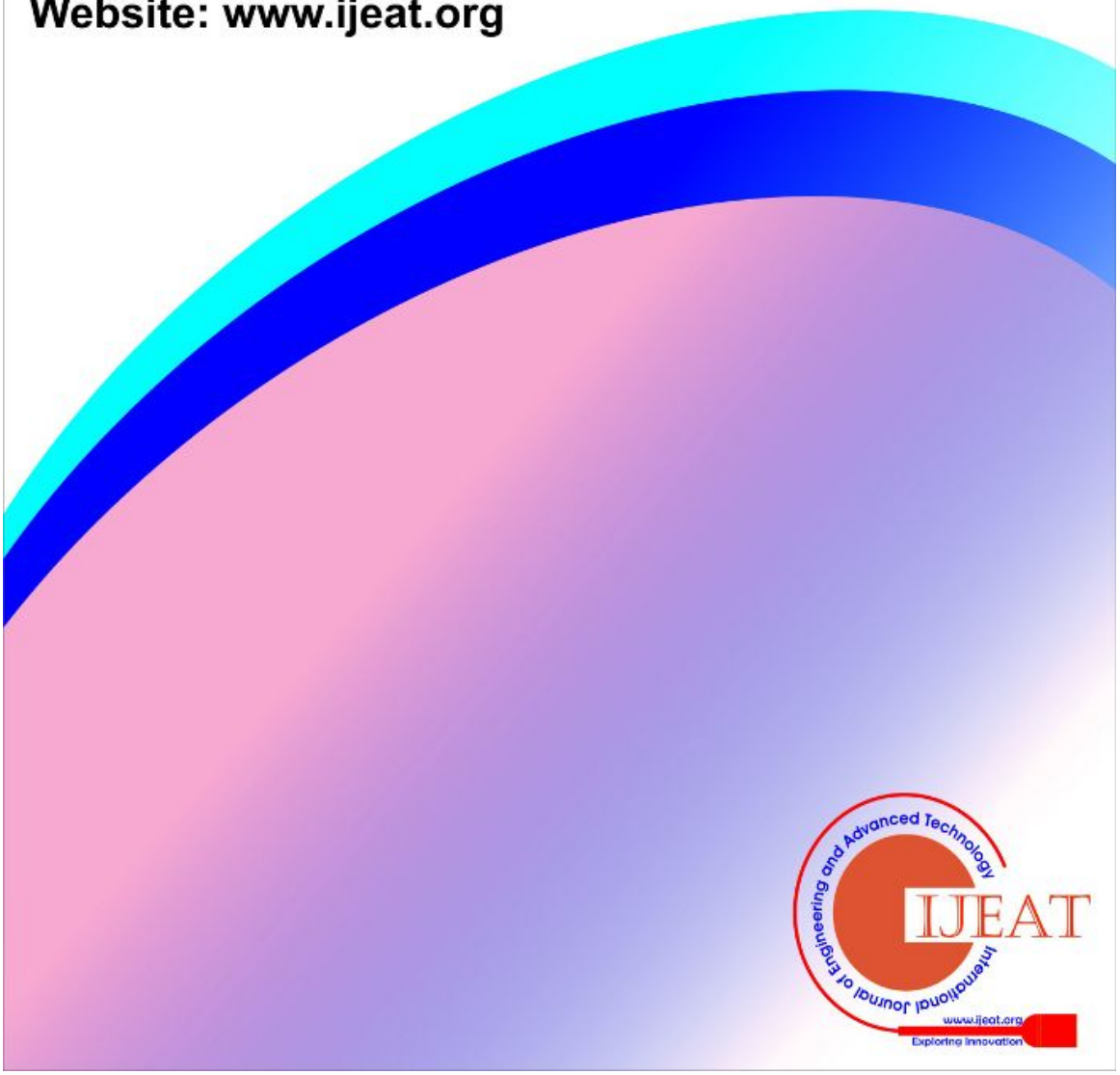
International Journal of Engineering and Advanced Technology

ISSN : 2249 - 8958
Website: www.ijeat.org



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Identifying Essential Skills Requirement in Indonesian Construction Sector

Henny Pratiwi Adi, Moh Faiqun Ni'am

Abstract— Labors is one of important element in construction projects implementation. Labors should have a good basic skills to be able to use the skills on the field work effectively, this capability is referred as essential skills. This study aims to identify essential skills needed to work on the construction sector in Indonesia, on the job of carpenters, bricklayers, plumbers and painters building. Data was collected through interviews and distributing questionnaires to users of Indonesian construction labors in Indonesia. Respondents were asked to provide an assessment of the essential skills required by their importance for the construction project. Determination of essential skills ranking were analyzed with the Relative Importance Index (RII). The results showed that the essential skills needed on the job of carpenters, bricklayers, plumbers and painters are numeracy, thinking, working with others and continuous learning.

Index Terms— essential skills, construction labors.

I. INTRODUCTION

Workforce is one of the important elements that affect the continuity and smooth implementation of construction projects (Adi, 2009). Muya et.al (2004) stated that in future the construction industry requires a skilled construction workforce (skilled labor), with specific skills. Availability of skilled labor is a major factor to obtain a quality product. There was also an important factor to gain customer confidence in an industry.

According to Odusami (2002), skills can be defined as the ability to perform the task well or better than average. Skills can also be described as the ability to translate knowledge into action. Katz (1974) proposed three types of skills as an approach to understanding skills. These skills are technical skills, human skills and conceptual skills. Technical skills related to the object, related to human skills and human skills conceptual associated with the idea. These three concepts have implications for skills development implementation. Katz said that the workforce requires the same level of competence in all of skills (Rizwan, 2008).

Labors should have a good basic skills to be able to use the skills on the field work effectively, this capability is referred as essential skills The important level on each essential skills varies depending on the type of job in construction project (Enshassi et.al, 2009).

Sometimes a project failure is not caused by a lack of technical skills of labor, but it can also be caused by lack of labor skills essential. However it does show that the construction labor not only need to have the technical skills, essential skills are also needed to interact and do a good job (Tong, 2003).

Manuscript received December, 2013

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This research was conducted to identify the essential skills required in the construction sector in Indonesia. Job title studied were carpenters, bricklayers, plumbers and painters buildings.

II. FUNDAMENTAL THEORY

A. Skills in Construction Sector

Mulya et.al (2004) stated that the effectiveness of the construction industry in each country in the future will depend on the quality of labours education and training. Availability and need for skilled labor will increase. Several studies (Odusami, 2002; Odusami et al., 2007; Charlesraj et al., 2004; Gushgari et al., 1997; Mulya et al., 2004; Farrell and Gale, 2003) have examined the fundamental skills needed to improve the performance of the construction industry.

Odusami (2002) defines skills as the ability to perform a task well or better than average. It also is defined as the ability to translate science into action. Gushgari, et.al (1997) defines some skills, communication skills is defined as the ability to interact effectively with other people at all levels, administrative skills is defined as the ability to regulate and control the project in relation to cost constraints, while the decision-making skills is defined as the ability to take appropriate actions under the constraints of time, information and resources.

Kate (1974) identified three categories of managerial skills are fundamental to achieving the success of management, namely technical, human and conceptual. Technical skills include process, knowledge and expertise, human skills include the ability to interact effectively with others, while the conceptual skills include formulation of an idea. So it can be said that the technical skills to deal with the matter, human skills associated with human and conceptual skills must be done with the idea.

Odusami (2002) suggests that managers levels in an organization is determined by the ability of technical, human and conceptual owned. For example, supervisors need to set the appropriate technical skills or areas of expertise. While the top-level managers need conceptual skills to monitor the organization. At all levels of management need human skills to interact and communicate with others. Construction labours at the level of skilled labours, in desperate need of the kinds of essential skills and technical skills.

B. Essential Skills

Essential skills according to Human Resources and Skills Development Canada (1994) is a human skill to perform a variety of tasks daily variations. These skills are widely used in various fields of employment. The Oregon Diploma (2008) defines essential skills as a process that brings together the skills of the academic discipline and basic skills standards. Skills contains no specific expertise and can be applied in a variety of subjects and backgrounds.

Essential Skills Portfolio (2009) explained that the essential skills necessary for the company to evaluate the training needed for workers as well as used to assess the effectiveness of the training program. For workers essential skills can be used to guide workers in understanding alternative jobs available to them and what skills must be improved to achieve their employment goals. The Oregon Diploma (2008) identified eight (8) types of essential skills that must be possessed by a worker to enter the world of work, namely:

1. Read and comprehend a variety of text
2. Write clearly and accurately
3. Listen actively and speak clearly and coherently
4. Apply mathematics in a variety of settings
5. Think critically and analytically
6. Demonstrate civic and community engagement
7. Demonstrate global literacy
8. Demonstrate personal management and teamwork skills

Enshassi, et al, 2009 stated that essential skill is one of skills type that are critical to achieving client satisfaction.

Based on the findings of the Human Resources and Skills Development Canada (2005), identified 10 types of essential skills that must be owned by the construction labors, namely:

1. Reading (skill to understand words, sentences or paragraphs (such as documents, letters, guidelines etc.)).
2. Document use (skill to read, understand and use the information (such as text, symbols, numbers) on various types of documents, tables or forms).
3. Numeracy (skill to use numbers and thinking in quantitative terms to complete the job).
4. Writing (skill in written communication with a set of words, numbers and symbols on the document).
5. Oral communication (skill in oral communication, conveying ideas and information).
6. Working with others (skill in interacting and working with others to get the job done).
7. Thinking (skill in obtaining and evaluating information to make rational decisions)
8. Computer use (skill to use the computer).
9. Continuous learning (skill to participate in the ongoing process to improve the capabilities and knowledge).
10. Finding Information (skill in getting information that support the implementation of the work.

While Essential Skills Portfolio (2009) identified 14 essential skills for construction labors, namely: numeracy, use of memory, working with other, reading text, document use, writing, oral communication, problem solving, decision making, job task planning, finding information, computer use, continuous learning dan other information.

This study refers to the essential skills research conducted by Human Resources and Skills Development Canada (2005) and Essential Skills Portfolio (2009).

III. RESEARCH METHODOLOGY

The data was collected through questionnaires to identify the essential skills required by the contractor, working in the field of carpenters, bricklayers, plumbers and painters buildings. Respondents in this study were the contractor who employs construction workers in Indonesia. A total of 117 questionnaires distributed to contractors in Central Java, Indonesia. The questionnaires were collected back to complete and can be used for analysis is as much as 76 questionnaires (65%).

Likert scale of 1 to 5 are used to give weight to the value on the importance of Essential Skills assessment, which is very important (5), important (4), abstain (3), not important (2) and very important (1). Ranking essential skills in order of importance were analyzed using the Relative Importance Index (RII) (Naoum, 1998; Assaf et al., 2001; Fink, 1995; Enshassi, 2009). This index will be calculated using the following equation:

$$R.I.I = \sum_{i=1}^{n} [Sum^{n}(a_i.x_i)/n].100\% \quad (1)$$

where :

a_i = weight of value (1 up to 5)
x_i = frequency response of the weighted value
n = number of respondent

IV. RESULT AND DISCUSSION

In this research, essential skills ranking compiled based on the level of importance of these skills in supporting the implementation of a construction project. The essential skills used in this study were reading, document use, numeracy, writing, oral communication, working with others, thinking dan continuous learning. Here is a ranking of essential skills in the field of work carpenters, bricklayers, plumbers and building painters.

A. Carpenter

On the job of carpenter, numeracy skills is the most needed skills. Accuracy in estimating the size of an object, requires good numeracy skills. The next rank is thinking skills, where these skills are needed to solve the problems faced. Working with others skills ranked the third, work on construction projects involve a lot of manpower, so it requires cooperation. Continuous learning skills and writing skills have the same rank. Ranking essentials skills in carpentry job title can be seen in Table 1.

B. Bricklayer

On the job of Bricklayer, thinking skills and numeracy skills are the most needed skills. Work as a bricklayer requires numeracy and thinking skills are quite good, because this work requires great care and precision. For example, to make the mortar mix that requires precision in regulating the composition. Oral communication was ranked third on the essential skills are essential for the construction workforce. Ranking essentials skills on the job of bricklayer can be seen in Table 2.

C. Plumber

On the job of plumbers, thinking skills is the most needed skills, while numeracy skills is ranked second. Working as plumbers requires precision in evaluating problems at work. For example piping work such as making pipe connections require good numeracy skills. Ranking essentials skills on the job title plumbers can be seen in Table 3.

D. Painter

On the job of painters, numeracy skills is the most needed skills. While thinking skills ranked second. Numeracy skills and thinking skills in the work field painters, are needed in the process of mixing paint, which must be done with the right composition. While working with others skills are also needed

Table 1 Ranking Essentials Skills on the job of Carpenter

Type of Essential Skills	N	Minimum	Maximum	Mean Score	R.I.I	Rank
Numeracy	76	10	24	3.498	0.700	1
Thinking	76	6	24	3.436	0.687	2
Working with others	76	9	19	2.928	0.586	3
Continuous Learning	76	7	19	2.868	0.574	4
Document use	76	6	19	2.864	0.573	5
Oral Communication	76	9	20	2.834	0.567	6
Writing	76	7	19	2.824	0.565	7
Reading	76	6	15	2.174	0.435	8

Source: Primary data analized, 2012

Table 2 Ranking Essentials Skills on the job of Bricklayer

Type of Essential Skills	N	Minimum	Maximum	Mean Score	R.I.I	Rank
Numeracy	76	8	24	3.528	0.706	1
Thinking	76	9	24	3.528	0.706	2
Oral Communication	76	8	19	2.910	0.582	3
Working with other	76	7	19	2.892	0.578	4
Document use	76	6	19	2.876	0.575	5
Continuous Learning	76	8	20	2.858	0.572	6
Writing	76	7	19	2.848	0.570	7
Reading	76	6	14	2.200	0.440	8

Source: Primary data analized, 2012

Table 3 Ranking Essentials Skills on the job of plumbers

Type of Essential Skills	N	Minimum	Maximum	Mean Score	R.I.I	Rank
Thinking	76	10	24	3.622	0.724	1
Numeracy	76	10	24	3.574	0.715	2
Continuous learning	76	9	19	2.966	0.593	3
Working with others	76	7	19	2.934	0.587	4
Oral Communication	76	8	20	2.898	0.580	5
Document use	76	6	19	2.884	0.577	6
Writing	76	7	19	2.878	0.576	7
Reading	76	6	15	2.102	0.420	8

Source: Primary data analized, 2012

Table 4 Ranking Essentials Skills on the job of Painter

Type of Essential Skills	N	Minimum	Maximum	Mean Score	R.I.I	Rank
Numeracy	76	5	24	3.484	0.697	1
Thinking	76	6	22	3.370	0.674	2
Working with others	76	9	19	2.948	0.590	3
Continuous Learning	76	8	18	2.922	0.584	4
Oral Communication	76	7	19	2.900	0.580	5
Document use	76	7	19	2.882	0.576	6
Writing	76	7	20	2.832	0.566	7
Reading	76	7	15	2.128	0.426	8

Source: Primary data analized, 2012

because painting work on a construction project usually involves a lot of labor. Good cooperation among the labors is important in the work of painting. Ranking essentials skills on the job of painter can be seen in Table 4.

V. CONCLUSION AND RECOMMENDATION

Essential skills is one of the skills needed by users of construction workers. Types of Essential skills needed in the job of carpenters, bricklayers, plumbers and painters have in common. Numeracy skills, thinking skills, working with others skills and continuous learning skills are kind of essential skills that are needed in the areas of work carpenters, masons, plumbers and painters. Therefore labor in the construction sector need to have the essential skills, in order to meet user requirements of Indonesian construction labors.

ACKNOWLEDGMENT

Our gratitude goes to the Directorate of Higher Education of Indonesia that has funded this research, as well as all those who participated.

REFERENCES

[1] Barker, M., Hipkins, R. and Bartholomew, R., (2004), Reframing the Essentials Skills: Implications for and from the Science Curriculum, A commissioned research report for the Ministry of Education, Wellington, New Zealand.
[2] Enshassi, A., Mohamed, S. and Ekarriri, A., (2009), Essential Skills and Training Provisions for Building Project Stakeholders in Palestine, Journal of Construction in Developing Countries, 14 (1), pp 31–50.
[3] Farooqui, R., (2008). Assessment of Critical Skills for Project Managers in Pakistani Construction Industry, Proceeding of Conference on Construction in Developing Countries, August 4-5, Karachi, Pakistan.
[4] Gushgari, S. K., Francis, P.A., and Saklou, J.H, (1997), Skills Critical to Long Term Profitability of Engineering Firms, Journal of Management Engineering, 13 (2), pp 46–56.
[5] Keputusan Menteri Pekerjaan Umum No 340, 2007. Penetapan Standar Kompetensi Kerja Tenaga Terampil dan Tenaga Ahli, Departemen Pekerjaan Umum.
[6] Liimatainen, M. R., (2002). Training and Skills Acquisition in the Informal Sector, International Labour Office, Geneva.
[7] Nova Scotia Construction Sector Council, (2005), Essential Skills-Construction Related, Human Resources and Skills Development Canada (HRSDC).
[8] Nursyirwan, Iwan, 2006. Tenaga Kerja Konstruksi Indonesia Perlu Pengakuan, Buletin BPKSDM, Departemen Pekerjaan Umum, Vol 3.
[9] Odusami, K.T., Oyediran, O.S. and Oseni, A.O, (2007). Training Needs of Construction Site Managers, Emirates Journal for Engineering Research, 12 (1), pp 73–81.
[10] Odusami, K.T, (2002). Perception of Professionals Concerning Important Skills of Effective Project Leader, Journal of Management in Engineering, 18 (2), pp 61–67.
[11] Overtoom, C. G., (2000), Project Build : Integrating Technical and Employability Skills in Construction Industry, Information Analysis, Ohio State University.
[12] Pritz, S. G., (1995). Building Essential Skills for The Ohio Building and Construction Industry, Final Report Center on education and Training for Employment The Ohio State University & Ohio State and Construction Trade Council.
[13] Tong, L. F., (2003), Identifying Essential Learning Skills in Student's Engineering Education, The Higher Education Research and Development Society of Australasia (HERDSA), Conference Proceeding.

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