



APPLICATION OF THE SKILLED CONSTRUCTION MANAGEMENT TRAINING MODEL IN CENTRAL SULAWESI PROVINCE

Nirmalawati, Rara Labombang and Adnan Fadjar

Department of Civil Engineering, Faculty of Engineering, University of Tadulako, Palu, Indonesian

E-Mail: nirmalawati_she@yahoo.co.id

ABSTRACT

Economic development in the Central Sulawesi province has been increasing since 2007 so that it has an impact in increasing infrastructure development. For this reason, human resources are needed, one of which is skilled construction workers. In fact, skilled construction workers in Central Sulawesi Province still lacks competence in accordance with his skills and also does not yet have a skills certificate. Training for skilled construction workers is mostly done but the results have not been maximized so that they are unable to compete with skilled workers from outside the province. Therefore the purpose of this study was (1) to find out the application of training models for skilled construction workers that are based on the conditions in the Central Sulawesi Province; (2) to find out the results of testing the application of the training model for skilled construction workers in Central Sulawesi Province. The study used a quantitative, descriptive-correlational approach. The study population was skilled workers who had attended their skills training in Central Sulawesi Province. Data collection used structured interview techniques and the results of primary data were calculated using statistical calculations. The research results concluded, that: (1) the application of a skilled construction worker training model was made using the Project-Based learning model which is in accordance with the conditions of the Central Sulawesi Province that has scattered project locations; (2) the results of the training trials using the application of the accelerated skilled construction worker training model in Central Sulawesi Province received a Good score (with an average value 81,9).

Keywords: training, workers, skilled, construction.

1. INTRODUCTION

Economic development in Central Sulawesi province since 2007 has an impact on the development of infrastructure development, namely the construction of roads, high rise buildings and the construction of other supporting infrastructure buildings. One of the resources needed in this development is skilled construction workers, which of course will increase from year to year. It is also added that there was competition for workers of outside the region that had arrived a lot. In order to improve the skills of skilled local construction workers, the local government as well as the Public Works Agency, which *Bina Konstruksi* conducted training activities for skilled construction workers in regional level. Training of skilled construction workers is currently being carried out in the Central Sulawesi province which is done to pursue the need for construction workers in the region and to meet the requirements of having skills that are in accordance with their competencies.

The results of the initial monitoring in the field show that in fact not all skilled workers meet the requirements. There are still many skilled construction workers in the region who do not have skills certificates and there are still many skilled construction workers who do not have the opportunity to get jobs. So that more and more workers are coming from outside the province to carry out all infrastructure development work in Central Sulawesi province.

Based on the constraints or shortcomings described above, the researcher was encouraged to conduct a further study of the conditions of skilled construction workers in the Central Sulawesi province. So the purpose of this study was (1) to find out the application

of training models for skilled construction workers that are in accordance with the conditions in Central Sulawesi Province; (2) to find out the results of testing the application of the training model for skilled construction workers in Central Sulawesi Province.

2. LITERATURE REVIEW

2.1 Construction Skilled Workers

Construction workers are workers who work in a project assigned to carry out an activity in a construction project. Ervianto, W (2005) stated that labor is a resource that is not easily managed. The wages received vary according to the skills of each workforce. Also Thomas Aprilian (2010) stated that labor is every person who is capable of doing work, both inside and outside the work relationship to produce services or goods to meet their own needs or the community. Whereas the Regulation of the Minister of Manpower of the Republic of Indonesia Number 44 of 2015 concerning the Implementation of Workplace Accident Programs and Death Guarantees for casual daily workers, bulk and work agreements in certain period of time in the Construction Services Business sector states that Construction Workers, hereinafter referred to as workers, are any people who work on construction service projects by receiving salaries or wages.

The Government Regulation of the Republic of Indonesia Number 28 of 2000 concerning the business and the role of the construction services community, Article 15 explains that: (1) construction workers must follow job skills certification or work expertise certification carried out by the institution, which is stated in a certificate; (2)



job skills certificates are given to skilled workers who have fulfilled the requirements based on scientific discipline and / or certain skills. Likewise, the Regulation of the Minister of Public Works of Republic of Indonesia No. 09 of 2013 concerning the level of qualification of the workforce consists of experts and skilled workers. For skilled workers the sub-qualifications are further divided into: third-class, second-class and first-class skilled workers. Whereas Pamuji (2008) stated that construction workers are divided into direct workers, indirect workers and bulk workers.

So that it can be concluded that skilled construction workers are construction workers with skills certificates who are people who do work in a construction project to produce buildings and are entitled to receive a salary or wage.

2.2 Model of Construction Skilled Workers

Mathis (2002) states that training is a process where people achieve certain abilities to help achieve organizational goals. It is in accordance with the results of previous research regarding Manpower or human resources that have been carried out by Nirmalawati (2012), which was "Supply Demand of Human Resources in the Construction Sector in Central Sulawesi Province", collaborative research with LPJKN with the Ministry of Public Works. One of the results of the study concluded that the recommendations of government policies in improving the competence of human resources (SDM) of construction in Central Sulawesi Province should be given to empower human resources in the construction sector. The results of the study concluded that research is needed in terms of improving the skills of construction workers that is by making application models based on the conditions of the region and the character of existing skilled construction workers.

Research conducted by Hassan, F *et al* (2009) by title "Training the Construction Workforce: A Case Study of Malaysia" stated that in improving the competence of the construction workers, an effective type of training was needed to suit the needs of a very complex construction industry; the results of their research offered a type of training called "Construction Industry Master Plan (CIMP)". Research from Geoffrey Briscoe, (1990) analyzed the shortage of skills of workers in the UK, by conducting surveys in the South-East region, the results of his research found that the quality factor and number of trainees needed to be considered, and the results of this study were used to assess future prospects in solving the problem of skills shortages in the long-term construction industry.

Mangkunegara (2006) stated that there are various types of training models, which are: (1) Job method (*On The Job Training*), that is direct training in the workplace; (2) *Vestibule*, which is the method in a separate room that is used for training places for new employees, who will occupy a job, this method is very suitable for many participants; (3) Demonstration method, which is a demonstration showing and planning how a job or how something is done, this method involves reenactment; (4)

Apprenticeship method, which is a way to develop skills, this method as if the worker works while learning; (5) Simulation method, which is a method that makes a situation by creating a form of reality; (6) Classroom method, which is a method used to increase the knowledge of workers, this method is easier to learn in the room, because what is discussed is usually about concepts, attitudes, theories, and problem solving skills that must be studied.

As explained in the Decree of the Minister of Public Works Number 340/KPTS/M/2007 concerning the establishment of work competency standards for skilled workers and experts in construction services, training is intended to process the workers to be competent by building cognitive, affective and psychomotor domains. Important characteristics of competency-based training models not only focus on the workplace but also must be able to transfer and apply skills, knowledge and attitudes to new situations and the environment. The competency-based training model uses an approach that influences a person to obtain his competence in accordance with predetermined standards. The focus of results is the process of education and training, so that someone has a competence or someone who is called competent is required to do what must be done. The application of a competency-based training model that has been implemented by the relevant agencies and vocational training centers must be monitored by looking at the character and nature of the existing skilled construction workers.

Regulation of the Minister of Public Works and Public Housing Number 24/PRT/M/2014 concerning Guidelines for competency-based training in the field of construction services, in chapter IV article 6 paragraph 3 describes the implementation of training that can be implemented with an approach (a) off -the job training; and (b) on-the-job training. Off- the Job Training can be done by the following methods: (1) in-class training; (2) training in workshops and/or laboratories; (3) distance learning; or (4) mobile training. The training model has advantages and disadvantages, for learning models implemented *on-the-job training* models have advantages, such as activities carried out in a place along with workshop facilities that meet the requirements. The disadvantage is that if the learning process is not implemented properly then the skills of the workers will not be achieved. The learning model uses a model *off-the-job training* have satisfying results achieved, while the disadvantage for Central Sulawesi Province is that project location activities mostly have places far from the city.

2.3 Project Based Learning Model

Project-Based Learning Model is a learning method that uses projects/activities as media. Project-based learning is an effective educational approach that focuses on the creativity of thinking, problem solving, and interaction between students and their peers to create and use new knowledge. Particularly this is done in the context of active learning, scientific dialogue with active supervisors as researchers (Asan, 2005). Chan Lin (2008)



also revealed that the application of project-based learning can increase student involvement and self-confidence in using the technology needed.

Likewise, research conducted by Pribadi (2008) entitled "Application of Project-Based Learning Methods to Increase the Quality of Industrial Practice Learning in Undergraduate PTB Study Program", the results show that this learning can significantly improve student learning outcomes and the application of project-based learning can improve the quality of the learning process. Whereas Wena (2011) states that "project-based learning is as a learning model that involves students in the transfer of knowledge". Andri (2013) in the research with the title 'Effect of Project-Based Learning Model on Student Cooperation Levels and Results of Grade X TPM Student Learning in Drawing Subjects At SMKI I Jetis Mojokerto'. The conclusion is: the management of learning by using project-based learning falls into the good category, and the level of student collaboration is good and there is an influence of good collaboration on student learning outcomes.

"Project Based Learning" Model is designed by adjusting to field conditions, using a shorter time and not disturbing the workers in completing work in the field. More workers are focused in accordance with the work being done in the field. So the first step in this model uses problems in gathering and integrating new knowledge based on real experience. This model begins by providing guiding questions and guiding participants in a collaborative project that integrates various materials; participants who have different learning acceptance styles can provide opportunities for each participant to explore the material according to their abilities.

Some advantages in implementing this learning model are: (a) able to increase participants' motivation to learn; (b) improving problem solving skills; (c) making participants more active and successfully solving problems; (d) enhancing collaboration and practice communication skills; (e) providing experience and practice in organizing the implementation of project work; (f) making the learning atmosphere enjoyable. Weaknesses in this method are: (a) taking a lot of time to solve problems; (b) having cost a lot; (c) having a lot of equipment used; (d) there are participants who are less active in this learning; (e) participants who experience weaknesses in gathering information will experience difficulties.

3. RESEARCH METHOD

3.1 Research Location

The research location was in in Central Sulawesi province which is the largest province on the island of Sulawesi, with a land area of 68.033,00 km². The northern part of Central Sulawesi Province is bordered by the Sulawesi Sea and Gorontalo Province, the eastern part is bordered by Maluku Province, the southern part is bordered by South Sulawesi Province and Sulawesi Sulawesi, and the western part is bordered by the Makassar Strait. Data were taken in all regencies, which are: Banggai Kepulauan, Banggai, Banggai laut, Morowali, Morowali Utara, Poso, Donggala, Tolitoli, Buol, Parigi Moutong, Tojo Una Una, Sigi, and Palu city.

3.2 Research design

This research was a descriptive-correlational study, that is, researchers try to obtain information relating to the phenomenon observed today (Arikunto, 2002). The researcher tried to describe existing data. The population used in this study were skilled construction workers in Central Sulawesi province.

Method of Data Collection

Data collection was done by conducting interviews with relevant parties, where interviews were conducted in a structured manner, also by seeing the results of the trial value of the implementation of skilled training carried out. There are two types of data used in this study, which were primary data and secondary data. The collection of primary data was taken from competency test participants training in skilled construction workers in Central Sulawesi province conducted by the examining assessor. There were 20 participants who participated in the competency test for skilled construction workers, while secondary data were the data on the number of construction workers participating in the training taken from each worker who works on the project belonging to the Provincial office of *Bina Konstruksi* Ministry of Public Works. After completing the results of the test collected, there were 20 files collected, the data analysis was carried out, which was calculated using statistics and Ms Excel.

The measurement of the results of training trials using a scale with a score limit is as follows: (a) score of (86 - 100) if the answer is very good (SB), (b) score of (70 - 85) if the answer is good (B); (c) score of (60 - 69) if the answer is pretty good (CB); (d) score of (40 - 59) if the answer is not good (KB) and (e) score of (20 - 39) if the answer is very bad (SKB). It can be seen in Table-1 below:

Table-1. Scale measurement of Factors Affecting Training Results.

Score 20-39	Score 40-59	Score 60-69	Score 70-85	Score 86-100
Bad	Not good (D)	Pretty good (C)	Good (B)	Very Good



4. RESULTS AND DISCUSSIONS

A. Application of training model for skilled construction workers

The results of previous studies made by Nirmalawati (2007) stated that there are several factors that influence the training model of skilled construction workers, which are (1) the educational background of the participants, (2) the ability of the instructor, (3) infrastructure support for the learning process in training; (4) learning process towards the learning achievements of participants in training, (5) Participants' learning achievement towards the success of job skills training. And from some of these factors the learning process factor is the strongest factor in influencing the training model. Therefore it is carried out or analyzed to look for learning models that are in accordance with the conditions of the region in the Central Sulawesi province. The results of secondary data from the Construction Services Development Institute show that all training activities carried out from the year 2015 - 2017 has generated 6151 certified construction workers, and of the total skilled workers who have been generated and have certificates, 8,12% of the total skilled workers in Central Sulawesi

province were 75713 (2015 data). So that it is necessary to increase the implementation of construction workers empowerment activities so that all workers can have skills certificates as required by Law No. 2 of 2017 concerning construction services, which states that all workers must have a certificate.

From the results of secondary data, there should be done the improvement of the empowerment of construction workers by programming training of skilled construction workers and the competency test for obtaining certificates that will be resolved for 5 years with the additional 27 times more capacity than the current implementation, which is around 13.338 people/year. The implementation of increased competency of certified skilled workers using the old system will require costs, very large facilities and infrastructure. Because this is one of the policies that needs to be reviewed in making a training model application so that the target can be achieved or at least approaching which of course will be realized based on the provisions of Law No. 2017 concerning Construction Services which states that all construction workers who work in the field are required to have a certificate in accordance with their skills.

Table-2. Number of Certified Skilled Workers (2017).

Classification		Code	TK I	TK II	TK III	Total of Skilled Subclassifications
A	Architecture	TA	476	772	738	1986
B	Civil	TS	1026	1190	785	3001
C	Mechanical	TM	37	69	184	290
D	Electrical	TE	156	213	19	388
E	Environmental governance	TT	77	87	72	236
F	Etc	TL	60	57	133	250
total			1832	2388	1931	6151

Table-3. Number of Certified Skilled Workers in Central Sulawesi (2015).

No	Power	2013		2014		2015		Enhancement
		February	August	February	August	February	August	
	Construction	62 691	65 740	74 825	71 949	75 713	73 525	14,77 %

B. Developing a Training Model Application that can improve the competence of skilled construction workers in Central Sulawesi Province

Based on primary and secondary data as well as discussions and interviews with various parties, like stakeholders involved in handling skilled construction workers, including the Construction Services Development Institute of Central Sulawesi Province, Head of the Construction Sector in Central Sulawesi Province at the Ministry of Public Works and Public Housing, construction labor associations and various other parties can be summarized as a description below:

- Training activities in the context of empowering skilled workers require a long time and large costs due to the location of projects that are far apart and difficult to reach
- Training activities for skilled construction workers are generally carried out for 5 working days up to competency tests for 25 construction workers in each class or group.
- Training activities for skilled construction workers carried out using MTU cars have been effective, only the procurement of MTU cars has a very high cost. At present in the Central Sulawesi province only have 1 MTU car even then in the implementation of having



an expensive mobilization because the location of each project in the central Sulawesi province has a far distance.

- d) Training model application for skilled workers uses models "Problem Based Project", taken as a model because it is a model with an effective education approach that focuses on the creativity of thinking, problem solving, and interaction between their participants to create and use new knowledge. This is especially true in the context of active learning, scientific dialogue with active supervisors as researchers in accordance with statements from Asan (2005). It is expected that using this model will be able to generate faster and more skilled workers as expected.
- e) "Problem Based Project" Model is designed by adjusting to field conditions, using a shorter time and

not disturbing the workers in completing work in the field. More workers are focused in accordance with the work being done in the field.

C. The trial results of the application of skilled labor training models

The training that used the application of learning models to increase construction workers in Central Sulawesi Province carried out trials on 20 mason trainees. Activities were carried out in accordance with the operational standards provided. And from the results of this training, evaluation can be seen in Table-4. The calculation results obtain an average value of 81,9 So that this result shows that the average participant gets a Good category (see Table-1 results between 70 - 85).

Table-4. Training Trial Results.

No	Name	Value					Total	Average
		A	B	C	D	E		
1	Wahyu	78	85	85	83	83	414	82,8
2	Akram Vargorio	80	85	85	85	85	420	84,0
3	Supriadi	77	77	80	80	80	394	78,8
4	Mahmud Siwu	75	77	70	78	70	370	74,0
5	Muhammad Taufik	82	80	80	80	85	407	81,4
6	Aswan	82	84	84	85	80	415	83,0
7	Ronaldo	85	90	85	90	88	438	87,6
8	Zulfikar	80	85	85	80	87	417	83,4
9	Haryono	70	70	70	87	85	382	76,4
10	Wahyu Pradana	65	70	70	70	70	345	69,0
11	Agus Adriyanto	78	80	88	80	85	411	82,2
12	Aswan	80	80	80	80	85	405	81,0
13	Andi Ahmad	85	90	86	85	85	431	86,2
14	Josua Abram	85	90	88	90	90	443	88,6
15	Widya pradana	80	85	80	84	80	409	81,8
16	Aldi Aditya	78	88	88	85	85	424	84,8
17	Bambang Afrianto	78	87	87	85	88	425	85,0
18	Fahrur	80	82	85	82	85	414	82,8
19	Moh.akbar	75	80	85	88	88	416	83,2
20	Meldin Yulio	80	80	85	85	82	412	82,4
		78,7	82,3	82,3	83,1	83,3	409,6	81,9

Calculation of the value from the training results found that the overall average of 81,9 has good results (70-85). Participants who have very good grades are three people (15%), with scores above 85. Whereas one who has sufficient value is one person (5%), which is 69. While the remaining 16 people (80 %) has a Good score. From the

results of the training using the acceleration method, it can be seen that there is an increase in the competency of each participant.



5. CONCLUSION AND SUGGESTION

5.1 CONCLUSIONS

From the description of the discussion above, it can be concluded that: (1) the application of training models for skilled construction workers is made using the Project Based Learning Model which is in accordance with the conditions of the Central Sulawesi Province that has scattered project locations; (2) the results of the training trials using the application of the acceleration training model for skilled construction workers in Central Sulawesi Province received a Good score (with an average score of 81,9).

Suggestion

- It is suggested that the government and the private sector that manages the empowerment of skilled workers can evaluate the implementation of their activities by entering one of the methods using a project-based learning model.
- Other researchers can conduct further research by looking at other factors that influence the implementation of the performance improvement of skilled construction workers.

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REFERENCES

Andri. 2013. Penelitian dengan judul 'Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Tingkat Kerjasama Siswa dan hasil Belajar Siswa Kelas X TPM Pada Mata Pelajaran Menggambar Di SMKN I Jetis Mojokerto. Jurnal JPTM. Volume 01 Nomor 02 tahun 2013. Surabaya : Universitas Negeri Surabaya.

Aprillian Thoas. 2010. Analisis Produktivitas Tenaga Kerja Pada Pekerjaan Struktur Rangka Atap Baja (Studi Kasus Proyek Pembangunan Rumah Sakit Dr. Moewardi, Surakarta Jawa Tengah). Skripsi. Universitas Sebelas Maret. Surakarta : jurusan Teknik Sipil Fakultas Teknik.

Arikunto S. 2002. Manajemen Penelitian. Jakarta : Rineka Cipta.

Asan. A dan Haliloglu. Z. 2005. Implementing Project Based Learning In computer Classroom. The Turkish Online Journal of Educational Technology - TOJET. 4(3). <http://www.tojet.net/articles/4310.doc>. Diakses 3 Desember - 2016.

Briscoe G. 1990. Skill Shortages in the Construction Sector. International Journal of Manpower, 11(2):23-28, <https://doi.org/10.1108/01437729010135791>. England: MCB UP Ltd.

Chan Lin. 2008. Technology Integration Applied to Project-Based Learning in Science. Innovation in Education and Teaching International. 45 (1):55-65.

Ervianto, Wulfram I. 2005. Manajemen Proyek Konstruksi. Edisi Revisi. Yogyakarta: Andi Offset.

Hassan, F.dkk. (2009) Training the Construction Workforce: A Case Study of Malaysia: Centre of Excellence, MARA University of Technology. Malaysia:

Mangkunegara A.P. 2006. Evaluasi Kinerja SDM. Bandung: PT Refika Aditama.

Mathis L.R. & Jackson H.J. 2002. Human Resource Management. Jakarta: PT Salemba Emban Patria

Nirmalawati. 2012. Supply Demand Sumber Daya di Bidang Konstruksi di Provinsi Sulawesi Tengah. Jakarta: PU Bina Konstruksi.

Nirmalawati. 2014. Mempersiapkan Sumberdaya Manusia di Bidang Keteknikkan Berbasis KKNI di Wilayah provinsi Sulawesi Tengah. Palu: Fakultas Teknik.

Pribadi. 2008. Penerapan Model Pembelajaran Berbasis Proyek untuk meningkatkan Kualitas Pembelajaran Pratik Industri pada Prodi S-1 PTB. Jurnal Penelitian Kependidikan, Tahun 18, Nomor 1: p xx-xx.

Riaz Z. 2015. and et. Training of Construction Workers in Pakistan. European Journal of Business and Management www.iiste.org. ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online). 7(1), 2015. halaman 284-296.

Sugiyono. 2016. Metode Penelitian Kombinasi. Penerbit Bandung: Alfabeta.

Simamora Henry. 2004. Manajemen Sumber Daya Manusia. Edisi ke-3. Yogyakarta: Sekolah Tinggi Ilmu Ekonomi YKPN.

Thomas Aprilian (2010).

Wena Made. 2011. Strategi Pembelajaran Inovatif. Jakarta: PT. Bumi Aksara

Widiyatmoko. 2012. Pembelajaran Berbasis Proyek Untuk Mengembangkan Alat Peraga IPA dengan Memanfaatkan Bahan Bekas Pakai. Jurnal Pendidikan IPA Indonesia. Vol.X. Semarang: Unnes Journal.

Undang-undang Republik Indonesia No. 13 Tahun 2003, Tentang Ketenagakerjaan. Jakarta.



Undang-Undang Republik Indonesia No 23 Tahun 2014,
Tentang Pemerintah Daerah. Jakarta.

Undang-undang Republik Indonesia No 02 Tahun 2017,
Tentang Jasa Konstruksi. Jakarta.

Kep Men Pekerjaan Umum Nomor 340/KPTS/M/2007,
Tentang Penetapan Standar Kompetensi Tenaga Kerja
Terampil dan Tenaga Ahli di Bidang Jasa Konstruksi.
Jakarta.

Peraturan Pemerintah Republik Indonesia, Nomor 28
Tahun 2000 Tentang Usaha dan peran masyarakat jasa
konstruksi. Jakarta.

Peraturan Pemerintah No 23 Tahun 2004, Tentang Badan
Nasional Sertifikasi Profesi (BNSP).

Peraturan Menteri Pekerjaan Umum Republik Indonesia
No 09 Tahun 2013 jenjang kualifikasi tenaga kerja.
Jakarta.

Peraturan Pemerintah No 24 Tahun 2014, Tentang
Pedoman Pelatihan Berbasis Kompetensi Bidang Jasa
Konstruksi. Jakarta.

Peraturan Pemerintah No 30 Tahun 2000, Tentang
Penyelenggaraan Pembinaan Jasa Kostruksi. Jakarta.

Peraturan Pemerintah Republik Indonesia Nomor 78
Tahun 2015, tentang Pengupahan. Jakarta.

Peraturan Menteri ketenagakerjaan Republik Indonesia
Nomor 44 Tahun 2015 tentang Penyelenggaraan Program
Jaminan Kecelakaan Kerja dan Jaminan Kematian.
Jakarta.