BirEx JOURNAL
Budapest International Research in Exact Sciences
Medical, Biological, Argiculture, Engineering
Science and other related areas
e-ISSN : 2655-7827
p-ISSN : 2655-7835
http://www.bircu-journal.com/index.php/birex

The Application Analysis of Occupational Safety and Health Management Systems in Building Construction Projects SMA Medika Samarinda

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Abstract: *In a building construction project, the occupational safety and health of each individual greatly influences the performance of the construction project. Based on data from Jamsostek Samarinda, the number of work accidents continues to increase every year. Therefore, to reduce the rate of work accidents, it is necessary to have an occupational safety and health management system (SMK3) to create occupational safety and health for workers in the hope of creating a safe, efficient and productive work environment. In this study, the source of data collection used was data from workers at the project site which was then analyzed using the Univariate analysis method. Based on the results of the study, the application of SMK3 to the use of work equipment and facilities as well as other aspects in the construction project of the SMK Medika Samarinda building, including the level of assessment of good implementation where the percentage of the effectiveness level of implementation reached a value of 79.87% based on Government Regulation of the Republic of Indonesia Number 50 of 2012.*
Keywords: *occupational safety and health; project; univariate analysis*

I. Introduction

Indonesia is currently one of the developing countries in the world so that a lot of development is being carried out. Significant development occurred in the construction sector.

A construction project (Gould, 2002, in Eka Dannyanti, 2010), can be defined as an activity that aims to construct a building that requires resources, both costs, labor, materials and equipment. The building construction project is a job that has a very high risk of work accidents with the possibility of serious work accidents. The causes of work accidents are caused, among others, by human factors themselves who do not use Personal Protective Equipment (PPE), work not according to procedures, work while joking, put tools or items incorrectly, incorrect work attitudes, fatigue, boredom and so on. In addition to human factors, environmental factors are also caused, in the form of unsafe environmental conditions, such as machines without safety, work equipment that is not good but still in use, weather, and noise.

Occupational Health and Safety (K3) is a tool that protects workers from hazards due to work accidents. Protection is a right that must be fulfilled by a company. K3 aims to prevent, reduce, and even eliminate the risk of work accidents. Occupational Health and Safety (K3) in the construction project implementation process is highly prioritized by construction companies. If things happen that are detrimental to Occupational Health and Safety (K3), especially for workers. Automatically detrimental to construction companies in terms of cost and time.

The Occupational Health and Safety Management System (SMK3) is the structure, responsibilities, practices and procedures of a company's resources for implementing occupational safety management (ILO 1998). The definition of SMK3 is part of the overall management system which includes organizational structure, planning, responsibility, implementation, implementation, achievement, review and maintenance of occupational

safety and health policies, to achieve a safe, efficient and productive workplace.

The construction project for the Medika Samarinda Vocational High School does not escape the risks that may arise, including technical and non-technical risks, where technical risks include: materials, tools, labor, workload, etc. Another risk that can occur is work delays that can be caused by non-technical things including natural weather, finances, the surrounding environment, traffic jams around the project and also traffic accidents due to in and out of project vehicles, which can result in delays in work time.

The purpose of the study was to analyze the application of the Occupational Health and Safety Management System in the Construction Project of the Smk Medika Samarinda Building.

II. Research Methods

2.1 Types of Research

The type of research used is a descriptive survey by observing the environment and work processes. This descriptive survey is used to make an assessment of a current condition and implementation of a program, then the results are used to develop a plan for improving the program (notoatmodjo, 2012).

2.2 Sampling

The population in this study were workers who were involved in construction activities for the construction project of the smk medika samarinda building. The total population is 44 people, while the sample to be studied is 30 respondents from a total of 44 people, consisting of 1 collaborator, 2 contractors, 2 supervising consultants, and 25 workers. Determination of sample size using the Slovin formula (Siregar, 2011) to determine the minimum sample size that must be examined.

$$N = \frac{n}{1+ne2}$$

Note: n = sample size; n = population size; e = 10% sampling error tolerance.

2.3 Data Collection

Data were collected from the results of the field survey, namely the preliminary survey and the main survey. Sources of data are divided into: (1) primary data is data obtained directly from sources (opinions obtained from the literature (journals and books related to research).

2.4 Research Variable

These indicators and variables are based on practical guidelines for occupational safety and health in the construction sector published by ILO (2005) in collaboration with the Ministry of Manpower and Transmigration of the Republic of Indonesia and the National Labor Health and Safety Council, which in this study were grouped into 5 aspects. and 39 variables, which are as follows:

1. **Aspects of using PPE** consists of 6 variables: headgear/helmet, mask, protective goggles during welding work, gloves, safety belt, and boots'
2. **Aspects of an emergency** consists of 4 variables: information on evacuation routes, information in case of an emergency, first aid kits, and fire extinguishers.

3. **Aspects of structural work, scaffolding and stairs** consists of 10 variables: safety fences for work at a height of more than 2 meters, control of scaffolding conditions, scaffolding conditions, scaffolding connections, safety fences, stairs conditions, placement of materials and equipment on work at a height of more than 2 meters, signs/signs , safety instructions, the feasibility of existing work equipment in the field.
4. **Aspects of electrical work** consists of 4 variables: regular installation of electrical equipment, no peeling electrical cables, closed connection cables, and high voltage warning signs.
5. **Aspects of health and environmental hygiene** consists of 15 aspects: workers lifting materials, providing first aid, health insurance for each worker, use of masks in mixing cement and sand, use of masks in cutting ceramics, periodic health checks, workers do not force work if in an unhealthy condition, use ear protectors , adequate air circulation in the painting work, adequate lighting, work tools are not scattered, the work area is cleaned when finished working, temporary garbage dumps on the project, no chemicals are scattered or scattered around the project, and the work floor is not slippery

2.5 Data Analysis

This research was conducted using the univariate analysis method, namely the analysis carried out on each variable to determine the distribution and percentage of each variable. Then the results obtained are entered in the frequency table. Univariate analysis was carried out using the following formula (Notoatmodjo, 2010):

$$P = \frac{X}{N} x\ 100\%$$

Description :
P : Percentage
X : Number of occurrences in respondents
N : Total number of respondents

The results of the successful implementation of the Occupational Health and Safety Management System at the project site can be measured according to Government Regulation of the Republic of Indonesia Number 50 of 2012 as follows:

1. For the level of achievement of the implementation of 0-59% including the level of assessment of implementation is less.
2. For the level of achievement of the implementation of 60-84% including the level of assessment of good implementation.
3. For the level of achievement of the implementation of 85-100% including the level of assessment of the implementation is satisfactory.

III. Discussion

3.1 Univariate Analysis

Univariate analysis is a technique of analyzing data on one variable independently, each variable is analyzed without being associated with other variables.

a. Analysis of the Application of Aspects of the Use of PPE

The results of the analysis of the application of aspects of the use of PPE are presented in Table 1 below.

Table 1. Analysis of the Application of Aspects of the Use of PPE

No.	Items	Category Score Respondent (m)
1	Wearing a headgear/helmet	100%
2	Using a mask	70%
3	Use eyeglasses protector moment welding job	100%
4	Using gloves	47.33%
5	Using a seat belt	40.33%
6	Using boots	38.67%
Total		396.33%
Average		66.01%

Based on Table 1 above, it is known that the level of application of K3 in the aspect of using personal protective equipment (PPE) is on average around 66.01%. The use of personal protective equipment (PPE) has not been fully implemented because it is related to the culture of workers who are not familiar with the application of K3 with a low risk level and a small work scope. The company has provided PPE for workers, but workers do not wear them such as gloves, seat belts and boots.

b. Analysis of the Implementation of Aspects of Emergency Conditions

The results of the analysis of the implementation of the emergency condition aspect are presented in Table 2 below.

Table 2. Results of the Analysis of the Implementation of the Aspects of Emergency Conditions

No.	Items	Category Score Respondent (m)
1	There is clear evacuation route information if an emergency occurs	55%
2	There is clear information to do workers in case of emergency	65%
3	There is a first aid kit	100%
4	There is a fire extinguisher	100%
Total		320%
Average		80%

Based on Table 2 above, it is known that the level of application of K3 in the aspect of emergency conditions is around 80.00% on average. This aspect has been implemented well, although not yet fully, this is due to the incomplete information that must be carried out by workers in an emergency. Information is generally available at the guard post or there is a briefing at least once a week.

c. Analysis of Application Aspects of Structural Work, Scaffolding and Stairs

The results of the analysis of the application of aspects of structural work, scaffolding and stairs are presented in Table 3 below.

Table 3. Results of Analysis of Application Aspects of Structural Work, Scaffolding and Stairs

No.	Description	Respondent Category Score (m)
1	There is fence safety for profession in height more than 2 meters	0
2	There is a scaffolding condition control	100%
3	Scaffolding is in good condition (no rust, no cracks/dents, straight)	100%
4	Scaffolding joints in bonded condition good	100%
5	The safety fence is quite strong and rigid	100%
6	The condition of the stairs is quite strong and stiff	100%
7	Materials and equipment for work at a height of more than 2 meters placed in a condition not easy to fall	65.33%
8	In project all part equipment which dangerous to be marked/signed	100%
9	There are safety methods/instructions which can keep workers safe	55%
10	The work equipment in the field is still proper to use	100%
Total		820.33%
Average		82.03%

Based on Table 3 above, it can be seen that the level of application of K3 in the aspects of Structural Works, Scaffolding, Stairs is on average 82.03%. The reasons that have not been widely implemented include: there is no risk for buildings prone to collapse, work at a height of more than 2 meters is not considered risky, different risk preferences.

d. Analysis of the Application of Electrical Work Aspects

The results of the analysis of the application of electrical work aspects are presented in Table 4 below.

Table 4. Analysis Results of the Application of Electrical Work Aspects

No.	Items	Respondent Category Score (m)
1	Regular installation of electrical equipment	100%
2	There is no chipped power cord	100%
3	Using a closed connection cable	100%
4	There is a high voltage warning sign	100%

Total	400%
Average	100%

Based on Table 4, it is known that the level of application of K3 in the aspect of electrical work has been carried out very well, namely 100%. This is because the power cable is very risky if it is in an irregular state or there are parts that are peeled off, because it will be very easy to cause sparks / fires.

e. Analysis of the Implementation of Environmental Health and Hygiene Aspects

The results of the analysis of the application of environmental health and hygiene aspects are presented in Table 5 below.

Table 5. Results of Analysis of the Application of Environmental Health and Hygiene Aspects

No.	Description	Category Score Respondent (m)
1	Worker lift material no on worker ability	64.35%
2	Provided help first onaccident (P3K) in the event of an accident small	100%
3	There is health insurance for every worker	100%
4	Using a mask in mixing cement and sand	29.67%
5	Use mask in cut ceramic	44.67%
6	Worker check health by periodically	20%
7	Workers do not force work if in unhealthy condition	75%
8	Use protector ear moment cutting ceramics (hearing impaired)	0
9	There is sufficient air circulation at work painting	100%
10	Adequate lighting at the project site especially when working at night	60.67%
11	Work tools are not scattered	100%
12	The workplace is cleaned after work	100%
13	There is a temporary garbage dump on the project	100%
14	No chemical dispersed or scattered around the project	100%
15	Floor work no slippery (example: because oil or oil spill)	75.67%
Total		1070.03%
Average		71.33%

Based on Table 5, it is known that of the 15 aspects related to workplace health and cleanliness, as many as seven aspects have been carried out with an application rate of 100%, while those that are classified as low are using masks in mixing cement and sand, which is 29.67%, workers checkregular health care is 20% and workers do not use ear protection momentcutting ceramics (hearing loss), the average application of environmental health and hygiene aspects is 71.33%.

3.2 Assessment of SMK3 Implementation Results

The success of the implementation of the occupational safety and health management system in the workplace can be measured according to the Minister of Manpower Regulation Number: 05/MEN/1996. The recapitulation of the assessment of the results of the implementation of the Occupational Health and Safety Management System is presented in Table 6 below:

Table 6. Recapitulation of Implementation Result Assessment

Variabel	$\mathbf{X} = \sum \frac{N \,.\, m}{100}$	**Range**
Use of PPE	66,01%	Good
Emergency Condition	80 %	Good
Structural Work, Scaffolding and Ladder	82,03%	Good
Electrical Works	100%	Very good
Environmental Health & Hygiene	71,33%	Good
Total	399,37%	
Average	79,87%	

Description :
X = Average percentage of variables
N = Quantityrespondent
m = Respondent category score

Based on the results of the analysis, it can be obtained that the successful implementation of the Occupational Health and Safety Management System is taken from the average sum of all variables, which is 79.87%.

IV. Conclusion

4.1 Conclusion

Based on the results of the study, it was concluded that the Occupational Health and Safety Management System on the use of work equipment and facilities as well as other aspects of the Medika Samarinda Vocational High School Building project included a good implementation rating based on Government Regulation of the Republic of Indonesia Number 50 of 2012, with a percentage level of effectiveness reaching a value of 79, 87%.

4.2 Suggestion

1. It is necessary to educate workers about the importance of Occupational Safety and Health since the project has not yet been implemented, so that the project can be completed on time with zero accident status.
2. Further research is needed in more detail on Occupational Safety and Health in various fields of work/projects (more diverse types of construction, as well as more objective assessment methods).

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