

UDC 331

## EVALUATION OF OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM IN CONSTRUCTION PROJECT

Palanungkai Tomy\*, Rachmansyah Arief, Zacoeb Achfas

Graduate Program of Civil Engineering, Faculty of Engineering, University of Brawijaya,  
Indonesia

\*E-mail: [tomycivil27@gmail.com](mailto:tomycivil27@gmail.com)

### ABSTRACT

Construction projects develop equally with human life and the advancement of technology. Varied aspects of human life demand construction service providers to state competitive. Recently, issues on health and Safety Management System (SMK3) or *Kesehatan dan Keselamatan Kerja (K3)* has attracted attention. As the controller of SMK3 implementation, the government has made a set of regulations for the processes of SMK3 starting from the implementation up to the allocation steps. Project implementers are also demanded to stay committed SMK3 process such as by administering audits to check if the implemented OHS has met the standards set by the government. Every step in OHS implementation and management requires fund. Lack of understanding on the regulations issued by government related to OHS and the limited amount of fund for certain project is main causes of the low awareness upon the importance of OHS in a project. Punishments are given to providers upon the neglect of OHS management system procedures. This study employed a qualitative method and the data were collected from observation and interviews. The project identified in this study was considered a project with low level or risk. The project has been considered safe where less than 100 workers were employed, and the contract valued lesser than 100.000.000.00,- (one hundred million Rupiah). This study found out that this project has not yet implemented SMK3 process based on government regulation due to the absence of fund allocation for SMK3 process in the contract and the lack of the socialization on K3 regulations by the government.

### KEY WORDS

Health, safety management, project.

A professional organization focusing on health and safety management system (OHS) in USA, International Association of Safety Professional (IASP) has determined 8 principles of OHS that can be used as the base for the development of OHS management system (Ramli, 2010) as follows:

1. Safety is an ethical responsibility. OHS should be seen as a moral responsibility that guarantee workers' safety. Thus, OHS is not implemented only to fulfil the regulation, but business owners should also regard it as a protection of their workers' safety.

2. Safety is a culture, not a program. Some companies regard OHS merely as a program that should be implemented in order to obtain awards and certificate. In fact, OHS is beyond that consideration as its implementation is the reflection of the safety culture applied in a company. The values of OHS should be taken as the base in business development.

3. Management is responsible. Throughout this time, company management often casted out the OHS responsibility to supervisors and when accident occurred, they seemed to throw the responsibility away to workers on field. Whereas, ideally, this responsibility is under company management's duty. OHS responsibility is in the forms of policies, concern, leadership and total support upon the principles of OHS management system at workplace.

4. Employees must be trained to work safety. Every workplace, working environment, and type of job has different characteristics and different OHS requirement. Thus, OHS regulation cannot form itself among workers or other parties. The principles of OHS should be built and nurtured through coaching and training.

5. Safety is a condition of employment. An ideal workplace is a safe workplace. Favorable and ideal work environment supports better safety. Hence, the condition of OHS implementation in a company is the reflection of the employment condition of the company.

6. All injuries are preventable. The basic principle of OHS states that all injuries are preventable since accidents are triggered by certain causes. When the causes are prevented, accidents can be avoided.

7. Safety programs must be site specific. This principle emphasizes that OHS regulations cannot be perfectly made, imitated, or developed. OHS regulation should be specifically designed for particular site based on the risk potential of certain job including the work activities, culture, financial capability, and so on. OHS program should be especially made for each organization as the regulations cannot be simply imitated from other parties.

8. Safety is good business. Companies should not take OHS regulations as extra expenses. Instead, they should take it as a part of the production process and the part of business strategy. OHS is an integrated aspect of business activities. Good implementation of OHS gives positive benefits for the enterprises.

*Keppmenaker* 05 of 1992 states that OHS management system is an integrated part of the whole company system including the structure, planning, responsibility, implementation, procedure, process and resources utilization for the development, administration, accomplishment and maintenance of OHS regulations as the realization of risk management in order to create safe, efficient and productive workplace.

OHS is a systematic and comprehensive implementation of OHS within a complete management system through good planning, implementation, measurement and monitoring. According to OHSAS 18001, management system is a set of inter-related elements that are used to determine the appropriate policies and targets in order to accomplish certain objectives. OHS consists of two main aspects; management process and the elements of its implementation.

OHS process explains how the system should be implemented. The key elements of this system form an integrated management system. The elements include the responsibilities, authorities, inter-function correlation, activities, processes, practices, procedures and the resources. Those elements have to be put into consideration in determining the regulation, plans, objectives, and programs related to OHS. OHS process employs the PDCA approach (Plan – Do – Check – Action) to ensure that OHS system works simultaneously and sustainably along with the activities done by a company.

OHS system is implemented by determining the OHS policies by the top management as the realization of the commitment to support OHS implementation. OHS policies are then developed into detailed plans. Without good planning, the OHS process will be misguided, inefficient and ineffective.

The result of the planning process is then put into real action by employing the available resources, and various programs and supportive procedures are also applied to achieve the intended goals. The implementation of OHS should be evaluated based on the predetermined policies and business strategy to identify the problems in OHS implementation. Thus, companies may take immediate actions to improve the OHS implementation.

## METHODS OF RESEARCH

This study was employed using a descriptive approach in which results of interviews and documentation were elaborated. The obtained data were analyzed qualitatively before they were put into elaborative description. According to Patton (Moleong, 2001), data analysis refers to the “management process of data orders to be organized into certain patterns, categories and basic descriptions”. This definition emphasizes the importance of the data analysis in achieving research objectives. Meanwhile, the main objective of a qualitative research is to generate a theory from the collected data.

The data analysis was administered through these following steps as proposed by Bungin (2003).

1. Data Collection. Data collection is an integrated part of data analysis process. The data of this study were obtained through interviews and document analysis.

2. Data Reduction. Data reduction refers to the sorting, specifying, simplifying and transforming raw data in field notes. Data reduction was done by summarizing, coding, theme searching, clustering, memo taking, etc to leave out irrelevant data.

3. Data Display. Data display was done by describing certain well-arranged information that can lead to conclusion drawing and action determination. Qualitative data were presented in the form of narrative texts, matrix, diagram, table and figures.

4. Conclusion Drawing and Verification. This step was the last step of the data analysis conducted in this study. Conclusions were drawn by interpreting the meaning of the collected and presented data. In-depth data analysis was done between the data display and conclusion drawing since the analysis of qualitative data had to be done simultaneously, repeatedly and continuously. The implementation of data reduction, data display and conclusion drawing/verification reflect the success of the study as a set of inter-correlated analysis activities. The analyzed data were then interpreted and explained verbally to describe the facts obtained from the field as well as to answer the predetermined research questions in which only the relevant data were put into consideration. The implementation of those steps was also done to guarantee the validity of the data by analyzing the data from the field, personal documentation, official documentation, figure, pictures, and so on which were collected from interview and documentation.

## RESULTS AND DISCUSSION

This study included three types of construction job, allowing the researchers to identify and evaluate whether OHS process has been run properly based on the regulations. The three types of construction job were road construction job, building construction job and irrigation construction job.

### *Road Construction Job:*

- Organizer: PT.X;
- Target: Infrastructure development;
- Activity: Building the PSD of residence in potential area;
- Location: Nunukan District;
- Fiscal year: 2018;
- Contract value: Rp 15,620,724,669.

Table 1 – Budget Plan for Road Construction Project

NO	Description	Unit	Quantity	Contract		Percentage (%)
				Price per Unit (Rp)	Total Price (Rp)	
Div 1	Public Work					
1.1	Mobilization	LS	1.00	69,195,000	69,195,000	0.44
1.2	Base camp	M2	1.00	99,614,502.55	99,614,502.55	0.49
						0.93

### *Building Construction Job:*

- Organizer: PT. Y;
- Target: Infrastructure development;
- Activity: Establishing Indonesia shop building in the borderline;
- Location: Nunukan District;
- Fiscal year: 2018;
- Contract Value: Rp 15,680,765,191.77.

Table 2 – Building Project Budget Plan

NO	Description	Unit	Quantity	Contract		Percentage (%)
				Price per Unit (Rp)	Total Price (Rp)	
Div 1	Public work					
1.1	Measurement and Blowplank	M2	200.00	46,965.00	9,393,000.00	0.06
1.2	Project Name Plank	LS	1.00	1,000,000.00	1,000,000.00	0.01
1.3	Keet Direction	LS	1.00	10,000,000.00	10,000,000.00	0.06
						0.13

*IPA Construction Job:*

- Organizer: PT. Z;
- Target: IPA KAP. 50 LT/DT;
- Activity: SPAM (IKK);
- Location: IKK Kaliorang, Kaliorang Sub District, Kutai Timur District;
- Fiscal year: 2016;
- Contract Value: Rp.13,471,667,000.00.

Table 3 – IPA Budget Plan

NO	Description	Unit	Quantity	Contract		Percentage (%)
				Price per Unit (Rp)	Total Price (Rp)	
1.1	Mobilization and Demobilization		1.00	35,000,000.00	35,000,000.00	0.15
1.2	Temporary surrounding fence	M'	160.00	153,700.00	24,5982,000.00	0.20
1.3	Pegging and Measuring	LS	1.00	10,000,000.00	10,000,000.00	0.08
1.4	Office and warehouse buildings	LS	1.00	10,000,000.00	10,000,000.00	0.08
1.5	Water and electricity	LS	1.00	3,500,000.00	3,500,000.00	0.08
1.6	Demolition	LS	1.00	10,000,000.00	10,000,000.00	0.08
1.7	Name plate and signs	LS	1.00	2,500,000.00	2,500,000.00	0.02
1.8	Reporting and project administration	LS	1.00	7,500,000.00	7,500,000.00	0.06
						0.69

*General discussions.* Occupational health and safety system (OHS) is closely related to the fields of health, safety and welfare of workers who work for an institution or in project site. OHS is intended to guarantee the health and the safety around the work place. The system also give protections to fellow workers, workers' family, consumers, and other parties that might be affected by certain workplace condition.

Occupational health and safety is an important responsibility related to the morality, legality and financial aspects. Every organization holds the obligation to ensure the safety of workers while performing their jobs. The practice of OHS includes prevention, punishment, compensation, convalescence, provision of health care, and permittance of sick leaves. OHS deals with the studies of occupational health, safety procedures, industrial technique, chemistry, health physics, the psychology of organization and industries, ergonomics, and the psychology of occupational safety.

Construction job is one the riskiest jobs in the word. This field of work has caused the highest number of mortality among other sectors. Risk of falling over is the most frequent cause of accident at workplace. The use of standardized safety equipment such as guardrail and helmet supported by the implementation of safety procedure such as regular checks on non-permanent ladders and scaffolding are able to decrease the risk of occupational accident.

According to *Permenakertrans*, OHS is a part of company management that is meant to manage the possible risk that might occur at workplace in order to create safe, efficient and productive workplace.

To ensure the appropriateness of OHS implementation, administrative requirements should be properly fulfilled. Audits and certification have to be administered by authorized institutions.

There are two types of audit activities done related to OHS system implementation as follows.

a. Intern Audit. Intern audit is done by intern competent officers or auditors authorized by company leaders. Usually, intern auditors are assigned to evaluate the effectiveness of OHS system implementation for intern necessities. Ideally, intern audit is done twice a year or according to company's policy.

b. Extern Audit. Extern audit is conducted by independent auditing agencies assigned to measure the implementation of OHS based on the standards in order to obtain recognition from other parties or to fulfill certain business requirement such as the requirement needed to make cooperation with other parties, requirement for insurance application and so on.

The certification audit of OHS implementation should be conducted based on the predetermined categories mentioned in Government Regulation Number 50 of 2012.

There are 12 elements and 166 criteria as the references in conducting the audit as follows.

1. Early phase; fulfillment of 64 OHS audit criteria;
2. Transitional phase; fulfillment of 122 OHS audit criteria;
3. Advance phase; fulfillment of 166 OHS audit criteria.

Table 4 – The Categorization of Accomplishment

Company Category	Level of Accomplishment		
	0-59%	60-84%	85-100%
Early phase (64 criteria)	Weak	Good	Satisfying
Transitional phase (122 criteria)	Weak	Good	Satisfying
Advance phase (166 criteria)	Weak	Good	Satisfying

Companies that are listed in the critical or major category are failed in implementing the OHS procedure and used the indicators of program implementation which are not in accordance with the table above. Those companies are stated FAILED in implementing the system and they are required to attend coaching done by *Disnaker* before re-audit.

Appreciation in the forms of certificate and banners are given by the government to companies that successfully passed the audit based on the Government Regulation Number 50 of 2012. After the issuance of the *Permenaker* Number 26 of 2014, certificate and banners are awarded in such ways based on the level of achievement. Ever since 2015, banners are given only to companies that have implemented the OHS system in the advance category or have fulfilled 166 OHS criteria.

Table 5 – Evaluation of OHS System Implementation

Percentage	Early Phase (64 criteria)	Transitional Phase (122 criteria)	Advance Phase (166 criteria)
0 – 59 %	Lawsuits	Lawsuits	Lawsuits
60 – 84 %	Silver Certificate	Silver Certificate	Silver Certificate and Banners
85 – 100 %	Gold Certificate	Gold Certificate	Gold Certificate and Banners

Certificates and banners of OHS awards are given by the Ministry of Labor and Transmigration in OHS months between February – April in Indonesia which is centralized in Jakarta. The certificates are valid for three years. Temporary certificates are also given as a note that certain companies have administered OHS audit for business purposes while the issuance of the original certificates are on process.

*Case Study Discussion.* This study included 3 (three) types of construction in order to be able to thoroughly identify and evaluate whether the implementation of OHS system has been done properly based on the regulations apply.

Those three construction projects were administered by three different companies owned by one owner. This sample selection allowed the researchers to have easier access for data collection including easier interview process and observation. Three construction projects which were selected in this study were in the process of completing their jobs.

As stated in *permen 05/PRT/M/2014*, the fund for OHS implementation is allocated from the general costs. General costs in the budget plan are allocated for the general division or preparatory work.



Figure1 – Examples of OHS gold certificate (top left), silver certificate (top right), gold banner (bottom left), and silver banner (bottom right)

However, the data collected from the general division and preparatory work showed that there were no special fund allocated for RK3K nor were there any allocated for OHS management system implementation. Researchers then held interviews with project owners or project executors to find out more information related to this issue.

The results of the observation and interviews with project owners and managers related to the implementation of OHS process are presented as follows.

#### 1. Company Owners:

- Project owners had adequate knowledge on the importance of OHS system, yet they did not have adequate comprehension on the government regulations on this matter.
- Owners were also aware upon OHS as the qualification in project auctions. Thus, they needed to hire OHS experts and conduct OHS certification procedure to make them eligible for project auction.
- Owners have conducted safety talk, job complaint reports, and made every effort to ensure the safety and comfort for workers in performing their jobs.
- Owners hav also allocated certain amount of fund for OHS system implementation aside of budget plan as they considered fund as their intial capital to start the job. The fund was used for the provision of personal protective equipment including rubber boots and helmets. They also hired general OHS experts who were also the corporate staffs.
- Owners had no idea about RK3K. As the implication, they did not include the budget for OHS process into the general costs or preparatory work.
- Owners also admitted their negligence for not comprehending the regulations that rule OHS process and Public Work Service also never talked about OHS or RK3K in Pre Construction Meeting (PCM).
- Owners also made strong commitment to focus on the OHS system management process and would learn the regulations on this matter.

#### 2. Persons in Charge of Projects X & Y:

- Persons in charge were known to only understand the general knowledge about OHS process. They did not completely comprehend the detailed process.
- Persons in charge had seen and heard about OHS process, yet they rarely talked about it in their two projects.
- The implementation of OHS and OHS management system are considered important if they are stated in the agreement. Yet, persons in charge stated that projects or company that applied OHS were rare.

- In the projects observed in this study, workers were only equipped with personal protective equipment such as rubber boots, helmet and gloves, yet they seldom wore their goggles for comfort-related reasons. Companies required the workers to regularly held coffee morning (meeting) among the workers and project managers to identify the problems on site.
- There was no allocation for special fund, as the fund were allocated based on the process and the predetermined budget plan. When workers requested for additional equipment related to OHS, management made the best effort possible to fulfill them.
- Persons in charge suggested that if there are certain regulations related to OHS, early socialization should be held to educate them about the requirements, process and whether or not there are special fund allocated for the matter. If OHS is regarded as an obligation since it is stated in the contract agreement, companies are required to implement the process.

### 3. Persons in Charge of Project Z:

- It is found out that persons in charge of this project learned about OHS from articles and from their work experiences in mining industries where they were required to have general skill related to OHS.
- They had general knowledge about OHS but not yet specific one.
- They believed that OHS system should be implemented as it is a realization of moral responsibility, and it guarantees the quality of the projects.
- The process of OHS system management was run based on the agreed plan which had been discussed in PCM. On the field, OHS management system was not yet professionally implemented nor had it any specific implementation procedure.
- No special fund was allocated for the OHS process. Personal protective equipment such as rubber boots, gloves and helmet (not for everyone) were provided by company owners at the beginning phase of the projects along with the mobilization process.
- Persons in charge believed that the implementation of OHS management system would not be difficult if a company has skilled human resources, OHS expert, and special fund allocated for the process.
- OHS is one of aspects that supports the company to compete in national and multi-national scale. OHS is an important aspect to concern. It is expected that government give greater appreciation for project mangers and workers by giving guarantees of their rights.

As an expert of OHS management system, the researchers then shared some knowledge and educated them about the process of OHS management system implementation as stated in government regulations that apply.

The researchers also had the chance to share the general points of RK3L and emphasized the important points to consider in the implementation of OHS management system. The explanations included the ones about safety induction, posters, OHS signs, provision of personal protective equipment, occupational protective equipment, and OHS expert. More complex jobs that have higher risks have more requirements to guarantee workers' health and safety. Food intake and facilities are also important aspects in this matter as OHS is not only about safety, but it also deals with workers' health. The researchers also shared the examples of some legalized budget plan in which the costs of OHS management system implementation were included in the general costs or preparatory works.

#### *Project Executor: PT. Q*

- Types of Project: Road Construction;
- Activity: (RRDP);
- Location: Wawar – congot;
- Fiscal year: 2016;
- Contract value: Rp. 58.300.000.000,-.

Table 6 – Budget Plan that allocates the cost of OHS implementation

Pay Item Number	Description	Unit	Estimated Quantity	CONTRACT		Procent (%)
				Unir Price (Rp)	Total Price (Rp)	
Div 1	GENERAL					
1.1	Mobilization	L5	1.00	1.739.664.387,60	1.739.664.387,60	3,2850
1.2	Traffic Management and Safety	L5	1.00	99.614.502,55	99.614.502,55	0,1881
1.3	Environment Safeguard	L5	1.00	67.767.272,73	67.767.272,73	0,1280
1.4	Quality Control Management	L5	1.00	33.833.636,36	33.833.636,36	0,0639
						3,6650

It can be seen in the budget plan that the costs of safety or OHS are included in the general costs. The budget plan for the implementation of OHS management system in public works is a part of RK3K agreed and legalized in the Pre Construction Meeting.

It is presented that the costs for workers' safety and OHS is less than 1% out of the total expense of the project. If the implementation of OHS management system is well-planned through a set of appropriate processes, extra costs or unexpected costs cannot be avoided as the costs have been included in the general costs.

The general director of *Bina Konstruksi Kementrian PUPR*, Syarif Burhanuddin stated that the budget for K3 is usually allocated around 1.5% from the total project value. He stated that the amount of the fund is considered huge even if the percentage looks small. Aside from the percentage of the fund allocation, the main aspect to consider about this matter is the implementation. Workers often have low discipline to properly apply the OHS management system.

Proper implementation of OHS process will not disadvantage project owners. Project owners often considered this process as a burden that causes higher costs. Some companies even did not provide appropriate personal protective equipment as no specific fund were allocated for the provision. Fulfillment of good facilities for workers also supports the implementation of OHS management system. There are some aspects related to OHS that should be taken into account in order to make sure that construction company hire qualified workers, create accident-free project, and obtain satisfying results. In addition, companies are able to become competitive, certified, and eligible to take mega projects if they successfully implement the process of OHS management system as regulated by the law.

## CONCLUSION

### *Identification:*

- Regarding to *permen* 05/PRT/M/2014, the three projects observed in this study were considered having low risks and employed less than 100 workers with contract value lesser than Rp 100,000,000,000,- (one hundred billions rupiah).
- Generally, the OHS management system implemented in those projects did not yet meet the legal requirement on this matter. This problem occurred due to the lack of knowledge and comprehension of the related parties upon the implementation of OHS management system. The government as the person in-charge, supervisor and executor of OHS management system also did not yet give adequate attention on OHS implementation and they did not take this responsibility into serious account.

### *Evaluation:*

- As stated in Chapter III, verse 3 of the *Peraturan Menteri Tenaga Kerja* Number.05/MEN/1996 on basic requirement of OHS management system, assessment and evaluation can be done by conducting inspections, measurement, OHS audits, improvement and preventions.
- The three projects observed in this study did not properly implement the OHS management system due to the unavailability of special fund allocated for this matter.

The regulation requires that OHS costs should be included in the general costs which was not conducted as such by the executors since there had been no RK3K discussed previously in the Pre Construction Meeting (PCM).

*Costs of OHS Implementation:*

According to the regulation stated in *permen* 05/PRT/M/2014, the costs of OHS management system implementation in public construction projects are allocated from the general costs. The budget plan of the projects should be included in the RK3K agreed in the Pre Construction Meeting.

Meanwhile, the items of the OHS cost can be grouped into two categories as follows.

1. Direct Cost. Direct Cost is the cost that directly relates to OHS management system. This cost is relatively easier to measure, such as:

- a. Cost of preventive action toward OHS risks;
- b. Cost of evaluative assessment on the implementation of OHS management system;
- c. Compensations for workers.

2. Indirect Cost. Indirect Cost is the costs that do not directly relate with OHS which is relatively challenging to measure yet it significantly influences the success of a project such as:

- a. Costs to pay when accident occurs;
- b. Additional wage;
- c. Decreases in the production.

*Suggestions:*

- It is expected that executors of construction projects have better and stronger commitment in the implementation of OHS management system in companies and in implementing their projects;
- Providing workers with safety induction, personal protective equipment and proper facilities for workers;
- Future researchers are encouraged to conduct similar research to projects with bigger scale or the ones with higher risk potential.

## REFERENCES

1. Awuy, T. (2017). Faktor – Faktor Penghambat Penerapan Sistem Manajemen K3 Pada Proyek Konstruksi di Kota Manado. *Jurnal Sipil Statik*, 5(4), (187-194).
2. Bungin, B. (2003). *Analisa Data Penelitian Kualitatif: Pemahaman Filosofis dan Metodologis ke Arah Penguasaan Model Aplikasi*. Jakarta: Raja Grafindo Persada
3. D'orr, A. (2012). *Manajemen Proyek Lanjutan*. Jakarta: Indeks.
4. Husen, A. (2009). *Manajemen Proyek*, Yogyakarta: Andi.
5. Kerlinger, F. (1986). *Foundations of Behavioral Research* (3<sup>rd</sup> Ed). New York: Holt, Rineheart, ad Winston.
6. Moleong, L. J. (2001). *Metodologi Penelitian Kualitatif*. Bandung: Remaja.
7. Ramli, S. (2010). *Manajemen Resiko Dalam Perspektif K3*. Jakarta: Dian Rakyat.
8. Ramli, S. (2010). *Sistem Manajemen Keselamatan & Kesehatan Kerja OHSAS 18001*. Jakarta: Dian Rakyat.
9. Rawis, T. (2016). *Perencanaan Biaya Keselamatan & Kesehatan Kerja (K3) Pada proyek Konstruksi Bangunan (studi Kasus: Sekolah ST. URSULA Kota Mobagu)*. *Jurnal Sipil Statik*, 4(4), 241-252.
10. Soeharto, I. (1997). *Manajemen Proyek: Dari Konseptual Sampai Operasional*. Jakarta: Erlangga.
11. Sugiyono. (2008). *Metode Penelitian Kuantitatif, Kualitatif, R & G*. Bandung: Alfabeta.
12. Sukardi. (2013). *Metodologi Penelitian Pendidikan Tindakan Kelas, Implementasi dan Pengembangannya*. Jakarta: Bumi Aksara.
13. Umi, N. (2008). *Metodologi Penelitian Kualitatif dan Kuantitatif, Teori dan Aplikasi*. Bandung: Agung Media.
14. Winardi, J. (2004). *Motivasi & Pemotivasian Dalam Manajemen*. Jakarta: Raja Grafindo Persada.