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THE EFFECT OF OCCUPATIONAL HEALTH AND SAFETY (OHS) MANAGEMENT ON SAFETY BEHAVIOR OF WORKERS AT CONSTRUCTION SERVICE COMPANY IN SURABAYA

PENGARUH MANAJEMEN KESEHATAN DAN KESELAMATAN KERJA (K3) TERHADAP SAFETY BEHAVIOR PADA PEKERJA DI PERUSAHAAN JASA KONSTRUKSI SURABAYA

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Research Report
Penelitian

A B S T R A C T

Background: *Compared to manufacturing industry, construction has a unique characteristic. These characteristics cause construction projects to have dangerous conditions and make them vulnerable to an occupational accident.* ***Purpose:*** *To analyze the influence of Occupational Health and Safety (OHS) management on the building construction workers' safety behavior at construction service company Surabaya.* ***Method:*** *This research classification is observational and a cross-sectional research with analytic nature. This research is conducted over 4 months. The research sample amounted to 53 workers. Its dependent variable is safety behavior (OHS behavior) with the top manager's commitment, OHS procedure regulation, communication, worker's competency, interpersonal relationship and physical hazard as its independent variables. Data is descriptively analyzed in the form of a frequency table and cross-tabulation. A statistical test is performed by using the chi-square test with α=0.05.* ***Result:*** *Management commitment (p-value=0.001) and OHS procedure regulation (p-value=0.029) significantly affect the safety behavior implementation to the worker.* ***Conclusion:*** *Two Independent variables which affect the safety behavior of the building construction worker at construction service company Surabaya ware management commitment (X1) and OHS procedure regulation (X2). The regulation of OSH procedures must be communicated, promoted to workers, and supervision of workers can be increased as a form of good commitment and given support by providing rewards for workers who have implemented safe behavior properly and providing punishment for workers who conduct unsafe behavior.*

A R T I C L E I N F O

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A B S T R A K

Latar belakang: Konstruksi memiliki karakteristik yang unik bila dibandingkan dengan industri manufaktur. Karakteristik-karakteristik ini menyebabkan proyek konstruksi memiliki kondisi yang berbahaya dan rawan terjadi kecelakaan kerja. **Tujuan:** Menganalisis pengaruh manajemen Kesehatan dan Keselamatan Kerja (K3) terhadap *safety behavior* pada pekerja konstruksi bangunan di perusahaan jasa konstruksi Surabaya. **Metode:** Klasifikasi penelitian ini bersifat observasional dan merupakan penelitian *cross-sectional* bersifat penelitian analitik. Penelitian dilakukan dalam waktu 4 bulan. Sampel penelitian berjumlah 53 pekerja. Variabel terikatnya adalah *safety behavior* (perilaku K3) sedangkan variabel bebasnya adalah komitmen top manajer, peraturan prosedur K3, komunikasi, kompetensi pekerja, *interpersonal relationship*, dan bahaya fisik. Data dianalisis secara deskriptif dalam bentuk tabel frekuensi dan tabulasi silang. Uji statistik menggunakan uji *chi-square* α=0,05. **Hasil:** Komitmen manajemen (*p-value*=0,001) dan peraturan prosedur K3 (*p-value*= 0,029) berpengaruh signifikan terhadap penerapan *safety behavior* pada pekerja. **Kesimpulan:** Dua variabel bebas yang berpengaruh terhadap *safety behavior* pada pekerja konstruksi bangunan di perusahaan jasa konstruksi Surabaya yaitu komitmen manajemen (X1) dan peraturan prosedur K3 (X2). Peraturan prosedur K3 harus dikomunikasikan, disosialisasikan, dan dapat ditingkatkan pengawasan pada pekerja sebagai bentuk komitmen yang baik dan didiberikan support bagi pekerja yang telah menerapkan *safe behavior* yang baik dengan memberikan *reward* dan memberikan *punishment* bagi pekerja yang melakukan *unsafe behavior*.

Kata kunci:
Manajemen K3, Kecelakaan kerja, Konstruksi

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INTRODUCTION

The Employment Social Security Administration Agency (BPJS) employment data shows an increase in the number of work accident cases in the last five years. Since 2017, there have been 123.040 work accidents. The number increased by 40.94% to 173.415 cases in 2018. A year after that, work accidents increased again by 5.43% to 182.835 cases in 2019. Work accidents again increased by 21.28% to 221,740 cases in 2020 and as many as 234.270 cases in 2021. This number increased by 5.65% from the previous year (Mahdi *and* Bayu, 2022). Based on data from the Ministry of Manpower (Kemnaker) and BPJS, the construction industry sector is still the largest contributor to work-related accidents in Indonesia. The construction sector contributes 32% of the total work accident cases in Indonesia each year (Hasanuddin, 2022). It can be concluded that construction works require special attention in issues related to K3.

In accordance with Law of The Republic Indonesia Number 2 of 2017, construction work is the entire or part of activities that include building, operation, maintenance, dismantling, and rebuilding of a structure (Undang-undang RI, 2017). Organizational structure of construction company is established in full and entirely, consisted of physically interacted parts that includes leaderships, work executor, experts, material, fund, information, marketing, and the market itself. All those parts implement various kinds of interrelated works to form an internal system (Bachtiar *et al*., 2021). Construction work process absorbs many workforces and it can boost people's living standard and reduce unemployment. The data from the Department of Manpower and Transmigration showed an increased existence of construction service company that can absorb around 4.5 million work forces in Indonesia. Construction service becomes one of the most dynamic industries that, along with the relevant parties, fulfills the demand of actor within the construction industry (Utami, 2017).

Compared to manufacturing industry, construction has a unique characteristic. It can even be said that each construction project differs from one to another, with different problems during the execution process. Project planning and execution are done under time pressure and limited budget, with tasks that are almost entirely conducted by human labor along with the various type of skills of temporary and mobile natures, and heavily influenced by weather conditions and surrounding environment. These are some of the characteristics that differentiate construction projects from projects in other industry. They put construction projects in dangerous conditions and make them vulnerable to an occupational accident (Koloso, 2022).

Construction work that can be said to be the most dangerous is work carried out at heights and work carried out by excavation (Syafiq *and* Perdhana, 2018). Work accidents in these two types of work are often fatal and can result in permanent disability and even death (Setyawan *et al*., 2020). Additionally, Nurhijrah (2018) reveals that accident causes project time delay, additional cost, as well as company reputation damage. According to data from the Department of Manpower and Transmigration, during the year of 2005 to 2007, there are approximately 85.000 occupational accident cases, 1.700 mortality cases and about 7.000 permanent disability cases (Ronald. *et al*., 2012).

The main factors of occupational accident cause are human, equipment, and environment factors (Wahyudi, 2018). These three factors are interrelated and inseparable. Omission to the entire elements can be deemed as a management failure that may cause unsafe work methods, equipment, and procedures, that causing accidents. During the implementation of construction works, field workers frequently abandon various requirements that they should have performed. Among other things, the usage of inappropriate safety tools as well work method that is deemed to be unsafe. There are several causes, such as worker's attitude, where they do not feel any necessity to use them and consider that what they used to do was more efficient.

Henrich's theory (1952 cited in Pisceliya *and* Mindayani, 2018) divides the occupational accident causes into 2 groups, namely mechanical and environmental factor (unsafe condition) and human factor (unsafe action) groups. Several researches discover that human factor contributes the most as occupational accident cause (80 – 85%). This is in line with the Henrich's theory (1952 cited in Tarwaka 2018) that 80% of occupational accident is caused by unsafe act and 20% by unsafe condition along with other factors. Budiarti (2019 cited in Dana, 2021) that human negligence contributes 88% of occupational accident, 10% is caused by property/asset quality, while other factors contributes for 2%. A research is conducted by Primadianto *et al*. (2018) on the impact of unsafe act and condition to the construction occupational accident where the workers who frequently conduct unsafe act have a risk of 1.170 times higher to experience occupational accident compared to the workers who occasionally conduct unsafe act.Repairing the human factor in Indonesian work culture condition requires longer time and immense attempts. Making the work environment safer is a faster and easy way to reduce the occupational accident rate in the construction field.

MATERIAL AND METHOD

Based on its classification, this research is an observational one as the researchers only perform observation and measurement without providing any treatment or interaction with the respondents. While on basis of the time, this research is included

to *cross-sectional* research as the observation and measurement of independet variables and dependent variables will be combined and conducted within short period and simultaneously. Based on its nature, this research is included to analytic research which means that this research aims to see and know how much is the contribution of certain risk factor to an occurrence (Notoatmodjo, 2005).

The research is conducted in construction Service Company located in Surabaya. The research was conducted from June 1 to July 31, 2013. Research population is the entire workers (construction laborers) amounted to 200 workers. Sample was taken by using simple random sampling. The sample result is 53 workers to be involved as research's sample. Its dependent variable is safety behavior (OHS behavior). While its independent variables are top manager's commitment, OHS procedure regulation, communication, worker's competency, physical danger, and interpersonal relationship (Cooper, 2009). The variables of top manager commitment, regulation of OHS procedures, and physical hazards were measured through observations and interviews. While the variables of communication, worker competence, and interpersonal relations were measured using questionnaires. The categorization of top manager commitment variables, regulation of OSH procedures, worker competence, and physical hazards is divided into three categories, namely high, medium, and low. While the categorization of communication variables and interpersonal relationships is divided into three categories, they are: good, quite good and not good. The dependent variable in this study is safety behaviour. The categorization of safety behaviour variables is divided into three categories, namely good, quite good, not good. The determination of the category is based on the questions score provided. Data is descriptively analyzed in the form of a frequency table and *cross-tabulation*. A statistical test is performed by using the *chi-square* test with α=0.05. The multivariate analysis in this study used the Backward Method, (multinominal regression analyses in early and late stage) which is a method of eliminating one by one independent variables that do not have significant impacts on the dependent variables, so that all independent variables that have impacts on the dependent variable are obtained (Samosir *et al*., 2014).

RESULT

Individual characteristic outlook of construction service company Surabaya workers

Research sample amounted to 53 respondents with the characteristics can be seen Table 1, shows that the majority of respondents are 20 - 30 years old, which amounted to 40 respondents (75.47%). It can be summarized that the respondents' age is within the productive age range. 38 respondents (71.69%) have Senior High School and equal background education. Most respondents have an employment period of more than one year to two years, which amounted to 25 respondents (47.17%). Most respondents have never received OHS training in the amount of 51 workers (96.23%). Therefore, the number of accidents in the construction sector increases annually.

Table 1. Respondent characteristics of construction service company Surabaya

Respondent characteristics		Amount (N)	Percentage (%)
Age	20 – 30 years old	40	75.47
	>30 – 40 years old	8	15.09
	>40 – 50 years old	5	9.44
Education level	Elementary school	0	0
	Junior high school	15	28.31
	Experience in OHS construction training	38	71.69
	Diploma 1/Diploma 2/Diploma 3	0	0
	Bachelor degree	0	0
Employment period	<1 year	15	28.30
	>1 – 2 years	25	47.17
	>2 – 3 years	10	18.87
	>3 – 4 years	3	5.66
	>5 years	0	0
Experience in OHS construction training	With experience	2	3.77
	No experience	51	96.23

Distribution of OHS management and safety behavior of construction service company's workers in Surabaya

Data is coded, edited, scored, tabulated, and analyzed. Computer software is used to analyze the data. Univariate analyze can be seen in the Table 2. According to Table 2, there are only 11 (20.8%) respondents who scored the top management commitment to OHS application as good. Four respondents (7.5%) stated that the score of procedure regulation for OHS application is high. According to 24 respondents (45.3%), OHS-related communication is poor. Most workers' competency falls under the medium category of 25 respondents (47.2%). An interpersonal relationship is scored as poor by 23 respondents (43.4%). Only 9 respondents (17.0%) stated that the company has excellent physical danger. Most workers, or 38 respondents (71.7 %), stated that the company's workers have poor safety behavior.

The effect of OHS management on safety behavior of construction service company's workers in Surabaya

The analyze result can be seen in the Table 3, shows a significant relationship between management commitment and safety behavior (X2 17.982; *p-value*=0.001), significant relationship between OHS procedure regulation and safety behavior (X2 10.776; *p-value*= 0.029), communication variable does not affect safety behavior significantly (X2 8.053; *p-value*=0.090), worker's competency variable does not affect safety behavior significantly (X2 5.338; *p-value*=0.254), Interpersonal relationship variable does not affect safety behavior significantly (X2 5.338; *p-value*=0.254), physical danger variable does not affect safety behavior significantly (X2 8.904; *p-value*=0.064). Multivariate analysis is conducted using Backward Method, where non-influential free variables are removed one by one, making all free variables influential to the bound variables. Analysis results can be seen in Table 4.

Table 2. OHS management and safety behavior of construction service company's workers in Surabaya

Research variable	Category	Frequency	
		Amount	%
Management commitment	Frequency	11	20.8
	Medium	21	39.6
	Low	21	39.6
OHS procedure regulation	High	4	7.5
	Medium	16	30.2
	Low	33	62.3
Communication	Good	13	24.5
	Fair	16	30.2
	Poor	24	45.3
Worker's competency	High	12	22.6
	Medium	25	47.2
	Low	16	30.2
Interpersonal relationship	Good	15	28.3
	Fair	15	28.3
	Poor	23	43.4
Physical danger	High	9	17.0
	Medium	10	18.9
	Low	34	64.2
Safety behavior	Good	4	7.5
	Fair	11	20.8
	Poor	38	71.7

Table 3. The effect of OHS management on safety behavior of construction service company's workers in Surabaya

Free variables	Chi square (χ^2)	df	*p-value*	Remarks
Management commitment	17.982	4	0.001	Significant
OHS procedure regulation	10.776	4	0.029	Significant
Communication	8.053	4	0.090	Not significant
Worker's competency	5.784	4	0.216	Not significant
Interpersonal relationship	5.338	4	0.254	Not significant
Physical danger	8.904	4	0.064	Not significant

Table 4. Multinomial regression analysis (initial stage)

	Model fitting information			
Model	**-2 log likelihood**	***chi-square***	**df**	**Sig.**
Intercept on Final	74.559 27.030	47.529	20	.000
Pseudo R-square				
Cox and sne		.592		
Nagelkerke		.758		
McFadden		.590		
Likelihood ratio tests				
Effect	**-2 log likelihood of reduced model**	***chi-square***	**df**	**Sig.**
Intercept	27.030[a]	.000	0	
X1	42.442[b]	15.412	4	.004
X2	36.168[b]	9.138	4	.058
X3	32.233[b]	5.203	4	.267
X4	37.904[b]	10.874	4	.028
X6	34.489[b]	7.459	4	.114

Table 5. Multinomial regression analysis (final stage)

	Model fitting information			
Model	**-2 log likelihood**	***chi-square***	**df**	**Sig.**
Intercept on final	46.235 19.494	47.529	20	. 000
Pseudo R-square				
Cox and sne		.396		
Nagelkerke		.507		
McFadden		.332		
Likelihood ratio tests				
Effect	**-2 log likelihood of reduced model**	***chi-square***	**df**	**Sig.**
Intercept	19.494[a]	.000	0	
X1	34.784[b]	15.290	4	.004
X2	30.834[b]	11.339	4	.023

According to the initial stage analysis result, there are still insignificant free variables, namely OHS procedure regulation (X2), communication (X3), and physical danger (X6). Therefore, the next stage of analysis is required by removing the free variables of the highest *p-value.* The analysis result is shown in Table 5. The results show that there are two influential free variables, namely management commitment (X1) and OHS procedure regulation (X2), with a *p-value* (sig) of less than 5% or p<0.05. Consequently, it can be stated that significantly influential factors in safety behavior are management commitment and OHS procedure regulation.

DISCUSSION

Safety behavior

Safety behavior is an attempt that should be done to avoid the occupational accident. Particularly in construction projects with high accident rate. Safety behavior should be well applied. When this is not the case, it will worsen the condition within the construction project. Occupational accident in construction project is related to the unique characteristics of construction project: mobile, open working sites which is heavily affected by weather, limited execution time, dynamic and demanding a high physical resilience, paired with untrained workers along with substandard occupational safety management. The consequence is that the workers conduct unsafe action that may cause occupational accident (Kumar *and* Sridevi, 2019).

The condition of apartment building project in construction service company in Surabaya causes workers to perform their activities in open spaces such as excavation, casting, landfilling, and steel framing. Most workers are adult of productive age who have started their career and marriage life. Such condition will somehow affect the unstable mental condition. They start to entering new things while burdened by work condition in construction field that are quite complex and complicated, these all will affect the safety behavior applied by them.

Lack of training workers at construction project is shown as well in this research. Most worker's competency (47.2%) of apartment building project in this construction service company falls to medium category. Most employment period is in the range of more than one year to two years which reaches 47.17%. From the work experience point of view, the workers have just started this job and still require better work skill, particularly the skill in using building construction equipment. All of above are worsened by the fact that most of respondents have never received OHS training that amounted to 51 workers (96.23%). That condition is aligned with other results found that safety behavior applied by the workers of apartment construction project in this construction service company in Surabaya is poor (71.7%). Competency within work environment is vital. When a worker has a competency relevant to the work that they have to perform, they will show safe conduct while working as they are accustomed to it and are aware of the risks in the ongoing project works (Sianto *and* Hajia, 2022)

The aspect that should be taken notice of by management is better surveillance. Better supervision is one aspect that should be considered by the management. This is considering that the main responsibility of OHS is held by the highest management. The management should appoint the responsible personnel to ensure that the OHS policies are applied and conducted pursuant to provisions (Sudalma, 2022). When construction condition with such characteristics are well observed by supervisor or foreman, the unsafe action can be minimized. A proper management supervision system will drive the increased safety condition within organization (Hasibuan *et al*., 2020).

Analysis of OHS management effect to the safety behavior

A positive safety culture is one in which safety is a top priority and is integrated into every aspect of the company. A positive safety culture can be achieved when workers learn from insights and intuitions rather than learning from incidents, and change the way they think and act by sharing their experiences and solving problems together. In particular, entrepreneur leadership is the key in developing a positive safety culture (Kim *et al*., 2016).

The apartment building project management in construction service company in Surabaya is lacking in showing their commitment to the appropriate application of OHS. Management commitment can be seen from the worker's point of view. One of the methods that can be used is by viewing worker's perception from management commitment (Michael O'Toole, 2002).

A research resulted in 39.6% respondents who scored that company's leadership commitment in handling OHS issues are still low while management commitment is known to affect the implementation of safe act by workers (*p-value*=0.001). This means that safety behavior conducted by apartment building project workers in the construction service company, Surabaya, is affected by the management commitment. This commitment is a crucial aspect within an organization. When there is no management commitment, then the organization will not be able to operate appropriately. Commitment to safe act shows that the management is involved in increasing and maintaining an efficient and safe workplace (Setyawan *et al*., 2020). According to Bird and Germain (1990), commitment factor is one of the main factors in occupational safety culture that it will be hard to successfully run the occupational safety program without the support from the management. Additionally, lack of manager's concern to this safety matter encourages the workers to under value the company's commitment to the safety. Such poor commitment is shown by poor application of OHS procedure regulation (62.3%) and this is also statistically significant (*p-value*=0.029) to the

safety behavior application. Theoretically and pursuant to governmental rule, any company is required to make and implement Occupational Safety and Health procedures in ensuring workers' safety, health, comfort, security from the danger that may be occurred in the workplace (Manurung, 2020).

One of the reasons why people or workers frequently conduct unsafe behavior is due to the negligent attitude of the supervisor or manager to the safety aspect. These managers are directly or indirectly motivating the workers to take a shortcut, ignoring the fact that such behavior is harmful with an excuse for the sake of production interest. This circumstance will cause negative effect where the workers mistakenly learned that conducting unsafe behavior has led to reward granting. Unsafe behavior that should have been removed are reinforced to come into existence instead. The manager or supervisor become role model for the workers. When the supervisor gives exceptional model, the workers will follow such act. Thus, proper supervisor role can indirectly control the accident incidence at the workplace (Hanifah *et al*., 2020).

Two main causes in failed defense system is unsafe behavior or action conducted by the workers and other conditions from factors within the organization and work environment. Organizational factor is shown by commitment and poor application of OSH procedure regulation within the apartment building project of construction service company in Surabaya which affect the application of safe behavior conducted by the worker as indicated by *p-value* (sig) of less than 5% or *p-value*<0.05. Safety regulations and procedures applied by the company must be easily understood and applied in construction project (Bilqis *et al*., 2021).

Unsafe behavior is type of behavior that leads to accidents, such as working by neglecting the safety, conducting works without permit (Tarwaka, 2018). Unapplied safe behavior by the workers due to poor commitment and OHS procedure regulation application may cause unsafe behavior that will lead to accidents. Therefore, in order to minimize those events that are certainly not accepted by the project management, the safe behavior of the workers should be increased through the establishment of OHS commitment and appropriate OHS procedure application.

The suggestions for the management of apartment building project of this construction service company in Surabaya are to communicate and promote the OHS procedure regulation, making the workers aware and familiar with how it works. Communication can be done verbally and non-verbally. One example of non-verbal communication is poster. You can use Toolbox Meeting as verbal communication. Communication must be done properly and correctly (Sunardi *et al*., 2019). Furthermore, provide support through reward awarded to the workers who apply safe behavior correctly and punishment for workers who conduct unsafe behavior. Awarding reward and punishment is an effort to motivate workers to behave safely at the workplace (Andriyadi *et al*., 2021).

CONCLUSION

Most respondents are within age range of 20 to 30 years old, which amounted to 40 respondents (75.47%). A majority has had a Senior High School and equal as their background education in the amount of 38 respondents (71.69%). The employment period is in the range of more than one year to two years. Most of the respondents have never received OHS training that amounted to 51 workers (96.23%).

Top management commitment to the OHS application is not within the good category,21 respondents (39.6%) suggest that the management falls in the medium and low category for this aspect. 33 respondents (62.3%) consider the management to fall in low category regarding the OHS procedure regulation application. According to 24 respondents (45.3%), OHS-related communication falls in poor category. Most worker's competency falls under medium category which amounted to 25 respondents (47.2%). 23 respondents (43.4%) consider that they have poor interpersonal relationship. 34 respondents (64.2%) suggest that physical danger is in low level. Two influential independent variables to the safety behavior of construction workers in construction service company in Surabaya include management commitment (X1) and OHS procedure regulation (X2).

Suggestion for project management is to communicate and promote the OHS procedure regulation to the workers, making them aware and familiar on how it works. Increasing the surveillance of the workers as a form of good commitment and supported with reward granted to the workers who apply safe behavior appropriately and punishment to those who conduct unsafe behavior.

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