

Occupational Health and Safety and Practical Code of Safety at An Indonesian Agrochemical Company

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Abstract. The implementation of human resources maintenance function is a function of management used to support and maintain reliable human resources. The maintenance of workers' physical condition can be achieved by applying Occupational Health and Safety Program, and Labor Service and Insurance Social Program. The purpose of the study is to analyze dominant factors which affect the occupational health and safety of workers at PT. Indo Acidatama Tbk. based on the International Labor Organization's practical code of safety in the use of chemicals at work. The type of study used is descriptive study with quantitative method. The sampling technique uses non-probability sampling with incidental sampling type. The data collection was done by distributing 50 questionnaires consisting 30 question items to employees of PT. Indo Acidatama Tbk. Based on the results of data processing through factor analysis, a factor of occupational health and safety factor is formed involving the following subfactors: general responsibilities of employers, rights of the workers and personal protection of the workers.

Keywords: occupational health and safety, workplace safety, management practices

Introduction

Number of accidents in Indonesia is still high. According to data on website of *Badan Penyelenggara Jaminan Sosial* (BPJS – Indonesian Institute of Social Welfare), in the period of 2015 to 2017, more than one hundred thousand and seven hundred workers experienced severe accident in the workplace (Budi & Gilang, 2014). Among the most vulnerable work sites, the construction industry is the most dangerous one, followed by chemical and food manufacturing companies (Pangarso et al., 2017).

Some countries show that fatal accident rate events on construction projects are higher than the average of all industries. Not only in developing countries, in developed countries work accidents still require serious attention as well (Yazdani et al., 2015). In the past, experts used to consider that an accident in workplace is more often caused by the actions of workers' own mistakes (Endroyo, 2009; Ardhana et al., 2012). Nowadays such presumption has shifted that

workplace accidents can also be caused by organizational and management factors as well (Endroyo, 2009).

Workers and employees should be directed and controlled by the management to create secure work activities (Sukesri, 2018). In line with the latest crash-causing theories, the management must be responsible for the safety of its workers (Hamali, 2016). This paper will discuss the role of management within workplace accident prevention efforts.

Nowadays, work competitions drive company to optimize its own resources for achieving company's goals. According to (Fakhri et al., 2014), human resources activity is the most central part of management process and series of actions to achieve goals of the organization. This activity will work without any obstacle if it makes use of the functions of management (Fakhri et al., 2014). One of the functions of management which is used to support and maintain reliable human resources is the appliance of human resources maintenance function (Pradana &

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Wijaksana, 2017).

This function is related to the factors concerning people, money, equipment, facilities, materials and information (Hamali, 2016). All management functions should be imposed on all components of the business. In human aspect, planning/arrangements on working hours, break time, training and guidance on Occupational Health and Safety (OHS) are required (Zacharatos et al., 2005).

This training provides some important information about the general and dangers that may be occurred at work (Saragih et al., 2018). This also gives ideas about how certain hazards can be reduced or eliminated. However, it is important to remember that occupational safety and health practices do not just see one cause or result of the dangers, but also how to overcome them (Endroyo, 2009). A good practice creates a system that makes it possible to identify all hazards and risks in the company and how to deal with them sustainably.

This method develops because of the demands to build buildings in difficult places with varied forms of methods and desire to use minimal budget. Hence, management should be aware of what safety tools should be provided in implementing the method (Yazdani et al., 2015). Major projects clearly require implementation methods that must recognize the potential hazards as early as possible. In this case, information as the source of present and future communication flow is very instrumental in accident prevention (Pradana & Wijaksana, 2017). Information about the accident and its causes can be contained in an open-access file, in which the executor or contractor of job project can access information about accidents arising in similar work (Fakhri et al., 2014).

Furthermore, the guidance on how to avoid any work accident should exist in the very first place. The maintenance of workers' physical conditions can be achieved by applying Occupational Health and Safety Program (K3 in Bahasa Indonesia stands for *Kesehatan dan Keselamatan Kerja*), and Labor Service and Social Insurance Program. According to Zacharatos et al., (2005) and Sucipto (2014), Occupational Health and Safety Program is an effort to create protection and security from the risk of work accidents. In this case, accidents that endanger physical, mental, and emotional conditions of workers, companies, society, and environment (Yazdani et al., 2015).

International Labour Organization or ILO (1993) released some practical codes regarding the occupational health and safety in some company industries. To implement the appliance of Occupational Health and Safety Program, the practical code released by ILO will become the reference of this study (Yazdani et al., 2015, Sukesi, 2018).

One of the companies which apply Occupational Health and Safety Program is PT. Indo Acidatama Tbk., a company of agrochemicals industry. Even though it had applied the system of occupational health and safety, there were still 11 work accidents happened from 2013 which caused the loss of days to work, as seen in Table 1.

Table 1
Report on Workplace Accidents

No.	Date	Type of Injury	Description of The Accident	Lost Day of Work
1	19/06/2013	Minor Injury	From sitting position to standing, workers did not remember there was a pipe up above and hit their temples	0
2	20/02/2014	Minor Injury	The slippery floor cause hurt to worker's right hand (on rotating blower)	0
3	20/02/2014	Unable to work	Slipping and right hand on the rotating blower	0
4	18/03/2014	Unable to work	Falling from a height when installing a shuffle	10
5	4/6/2014	Minor Injury	index finger pinched while opening the garbage cart	0
6	25/11/2014	Minor Injury	Steam was discharged when cleaning FC 803 tank and almost got on the temple	0

7	29/12/2014	Minor Injury	Head was hit by a key falling from the top of tank	0
8	16/03/2015	Unable to work	Coal was trampled and slipped over the unopened blower	5
9	28/07/2015	Unable to work	When turning off the faucet in Area 550a, the hand is exposed to zinc because of its narrow location	1
10	11/11/2015	Unable to work	Fell from the tank truck while taking samples of drops (2.5 m)	1
11	14/07/2016	Unable to work	Got electric shock	8

Source: Internal Data of PT. Indo Acidatama Tbk

Although work accidents had decreased, PT. Indo Acidatama Tbk has not reached its target of zero accident every year. In addition, PT. Indo Acidatama Tbk is the chemical industry with hazardous chemical product that potentially creates explosion, hazards, and health problems which can be a high risk for workers.

Based on the above problems, the purposes of this study are to understand and analyze: (1) the appliance of occupational health and safety at PT. Indo Acidatama Tbk. based on the existing literatures or theories and practical codes released by International Labor Organization; (2) the dominant factors affecting occupational health and safety of workers at PT. Indo Acidatama Tbk. based on the ILO's practical code of safety in the use of chemicals at work.

According to Fakhri et al. (2014), human resources management is a process of employing human resources effectively and efficiently through planning, directing, and controlling all values which become the power to achieve the goals. In accordance with Sucipto (2014), Occupational Health and Safety is an idea and attempt to assure the integrity and quality of labors physically and spiritually in particular, and human in general, attainment, and culture towards the just and prosperous society.

This practical code, according to ILO (1993), is designed to be used by every individual who has the responsibility for security/safety in using the chemicals. It is not meant to replace the national laws, regulations, or used standards (Sukesi, 2018). The purpose is to deliver guidance for people involved in the conditions related to the use of chemicals at workplace (Pangarso et al., 2017). This practical code consists of few regulations, which are general responsibilities of the employers, general duties of workers, rights of the workers, and personal protections (Zacharatos, et al., 2005).

In Indonesia, several safety regulations and occupational health have been established, among others are Regulation no. 1 year 1970 on Occupational Safety and Ministerial Regulation no. PER/05/MEN/1996 on Safety and Health Management System at Work (Soputan, 2013). The rules are set to prevent and anticipate the occurrence of work accidents (Pangarso et al., 2017). Safety and health programs should start from the most basic stage, namely the establishment of a culture of safety and occupational health (Saragih et al., 2018).

Occupational safety and health programs can function effectively if they can be communicated to all individual layers at the company (Zacharatos et al., 2005). Working environment factors may include matters related to direct construction projects, such as excessive pressure against work schedules, equipment and safety equipment adequacy, lack of safety training provided for workers or lack of supervision on workers' safety (Reason, 1997, Yazdani et al., 2015).

These work environment factors can lead to errors and violation of workers' part, such as mistakes and offenses in the form of an insecure act of worker; for example, a violation of regulations and safety procedures, and one of the outcomes of the unsafe action on the work sites which again emphasizes the work accidents on worker part (Reason, 1997). Work safety is an important part of project implementation which means it needs to be given the same attention as quality, schedule, and cost supervision (Fakhri et al., 2014). The active involvement of company management is very important in creating a safe environment. According to the ILO guidelines (1993), general responsibilities of employers are setting out factory inspection or do labor inspection. Those cannot be ignored by the reason of recession. Prevention of

occupational health problems related to injury, illness, and death is a continuity of the days of business activities (Zacharatos et al., 2005). Furthermore, employers should ensure that all materials used at work, for example dangerous chemicals, are labeled or marked in accordance with the provisions on the provided chemical safety data sheets (Yazdani et al., 2015).

Employers should also maintain a record of hazardous chemicals used at workplace and it should be accessible to all workers (Rezaei et al., 2018). They should also take appropriate measures to protect workers from the risk identified by the assessment of risk (Rezaei et al., 2018). The risks cannot be fully eliminated or controlled, but they can be graded as high or low depending on the level of potential danger exists (ILO, 1993).

For the same purpose, employers should comply with appropriate standards formulated, approved, and recognized by the competent authority concerning safety. Employers should also ensure adequate and full supervision at work practices, and the application and use of the control measures provided (Sukezi, 2018). The arrangements should deal with the identified risk, including the provision of fire-fighting equipment and release containment measures (Rezaei et al., 2018).

In terms of general duties of workers, they are expected to take any required steps to eliminate or minimize risk for themselves and others (Pradana & Wijaksana, 2017), take care of their own health and safety and of others who may be affected by their carelessness (ILO, 1993), and make proper use of all protective tools (Sukezi, 2018).

The workers should also receive information on the risks which may arise from the use of hazardous chemicals in the course of their work, instruction, written or oral, based on the chemical safety data sheets, and training in the methods which are available for the prevention and control of (Hoyos & Zimolong, 2014). The same information should also involve protection against such risks, including correct methods of storage, transport and waste disposal as well as emergency and first-aid measures (Sukezi, 2018).

The goods and services industry has strived to improve work arrangements. However, the work environment can have a big impact on how well work is done and

the health of those who do it (Sukezi, 2018). Everything from the position of processing machine until storage tools can create obstacles and risks (Almost et al., 2018). The appropriate workplace and seating arrangements must be set in such a manner so that there is no harmful effect on health (Hoyos & Zimolong, 2014).

Adequate and appropriate seating must be provided for workers. This means arranging the work and working areas should suit the needs of workers, not expecting workers to do self-adjust. Ergonomic design is expected, which effectively provides workstations and convenient yet efficient equipment for workers to use (Pangarso et al., 2017). This also creates a healthy work environment since it regulates the work process to control or eliminate potential hazards. Workers will get the harmony of labor, environment, methods and work processes. Work environment must be arranged in such a way that can avoid muscle tension, excessive fatigue or other health problems. (Fakhri et al., 2014).

This safety cost should be explicitly included in the bidding of the project for ensuring its implementation. In residential projects, the level of a competition system tends to maximize the productivity and minimize the prices, as well as for cost of safety (Reason (1997). Effective yet safety management will benefit the companies because accidents will lead to direct and indirect costs (Pangarso et al., 2017).

Direct costs consist of medical expenses, insurance premiums, and property losses; while indirect costs are other additional costs, productivity reductions, delays schedules, increased administrative time, facility damage, and things that are increasingly difficult to measure but cause real human suffering and decreased morale (Reason, 1997). The name of the company will also be adversely affected which may result in a decreasing reputation that clearly influences the profit decrease in the company (Fakhri et al., 2014)

There is a basic need to adequate medical treatment and compensation for injuries and diseases resulting from the use of chemicals at work (Pradana & Wijaksana, 2017). Last thing, women workers should have their right of pregnancy and breastfeeding, have alternative works which are not involving hazardous chemicals, and have the right to return to their previous jobs at the appropriate time (Triwardhani & Trigartanti, 2012). According to ILO (1993), this practical code is

purposed to be used by every individual who has the responsibility for security in the use of chemicals. This practical code is not purposed to replace the national laws, regulations, or used standards (Sukesji, 2018). The purpose is to guide people involved in framing the conditions related to the use of chemicals at workplace (Pangarso et al., 2017). This practical code consists of few regulations, which are general responsibilities of the employers, general duties of workers, rights of the workers, and personal protections (Zacharatos, et al., 2005).

According to the ILO guidelines (1993), general responsibilities of employers are writing their policy and arrangements on safety and occupational health. It also covers all health impacts on workers from physical safety to mental and social well-being and the risks they cause. It will not be possible for an entrepreneur to identify and find solutions for all these elements without the collaboration with the workforce. This is one reason why consultation between workers and management is very important. (Zacharatos et al., 2005).

It is important to do risks assessment arising from the use of chemicals at work by taking into account the information provided by the suppliers or from reasonably available sources. The workers should also be protected by taking appropriate preventive measures (Sukesji, 2018).

Employers should make adequate actions or even arrangement to solve the effects of incidents and accidents involving chemicals, e.g. accidental exposure, fire, or explosion (as written in ILO guidelines, 1993). In this case, workers should have their rights as workers, which is the right to acquire information on chemicals substance used at work, or any hazard of such chemicals and precautionary measures contained in the labels or chemical safety data sheets in forms of language they can easily understand of (Triwardhani & Trigartanti, 2012).

The workers should also receive information on the risks which may occur because of the use of hazardous chemicals in the course of their work (Hoyos & Zimolong, 2014). Workers and their representatives should have the right to take adequate precautions, in cooperation with their employer, to protect worker against the risks of using hazardous chemicals at work (Triwardhani & Trigartanti, 2012). The need to request and participate in an investigation

by the employer or competent authority of possible risks resulting from the use of chemicals at work and investigations into accidents and hazardous occurrences bring the attention of their employer or competent authority about potential hazards arising from the use of chemicals at work (Triwardhani & Trigartanti, 2012). Furthermore, workers also have the need to avoid themselves from danger as a result of chemicals use when they have reasonable justification to believe that there is an imminent and serious risk to their safety and health, and workers should inform their supervisor immediately (Fakhri et al., 2014).

According to ILO (1993), personal protection includes personal and group protective equipment, protective clothing with the facilities of personal protective equipment according to international laws and standards (Sukesji, 2018). To reduce the risk of being exposed to chemicals hazardous, it is expected that workers prevent themselves from consuming anything or smoking in a work area which is contaminated by such chemicals (Fakhri et al., 2014).

By breathing through the mouth or nose, substances toxic can enter the lungs. An adult inhales about five liters of air per minute containing dust, smoke, gas or steam. Some substances, such as fiber can directly harm the lung. Others are absorbed into the bloodstream and flow to other parts of body (ILO, 1993). Digestion (swallowing) chemicals can enter the body when eating contaminated food, eat with contaminated hands or eat in a contaminated environment. Substances in the air can also swallowed when inhaled because it mixes with mucus from the mouth, nose, and throat. Toxic substances follow the same route as food that move through the intestine towards the stomach.

Absorption into the skin or invasive contact involves substance passing through the skin and goes into a vein, usually through hands and face. Sometimes, substances also enter through wounds and abrasions or injections (e.g. medical accidents). In this topic, Zacharatos et al., (2005) assessed three aspects of safety incidents, namely: (a) micro-accidents, which do not require time off of work, (b) near misses, which involve safety infractions but do not result in injury and (c) lost-time injuries, which cause the effect of delay in work because of injuries.

Chemical factors (chemicals and antibiotic drugs, cytostatics, narcotics and

others) exposure with small but continuous doses such as antiseptic to the skin, gases, medical rubber gloves or paramedics known as carcinogenic substances, as well as ergonomic factors (sitting, lifting heavy equipment with wrong body position) are often seen as injury instances in this kind of industry (Hasyim, 2005).

The physical factor of exposure with small doses, high humidity boiler and laundry room, barometric pressure on decompression chamber, heat radiation on skin, high voltage on the reproductive system, etc. as well as psychosocial factors, shift work, less harmonious working relationship are softer injury that might harm the human factor in a work environment (Zacharatos et al., 2005).

Accidents are unplanned, unexpected, unanticipated, adverse events, and considered as unintentional element (Reason 1997). There are several theories that explain the cause of an accident. Formerly, the theory of causes of accidents saw that accidents were caused by the mistake of workers, which known as 'The Accident-Proneness Theory' (Almost et al., 2018). Since the introduction of The Chain-of-Events Theory, The Domino Theory, and The Distraction Theory, the organization and management are considered to play a role in the events of accidents as well (Hoyos & Zimolong, 2014).

The presumption of occupational injuries sourced to insecure actions by workers have shifted to the assumption that workplace accidents are due to factors organization and management (Yazdani et al., 2015). Management must be responsible for the safety. Workers should be directed and controlled by management to create a safe work activity. On that theory, the latest is increasingly visible that the cause of work accidents is more complex. The new theories include 'Multiple Caution Model' and 'Constraint Response Theory', (Reason, 1997).

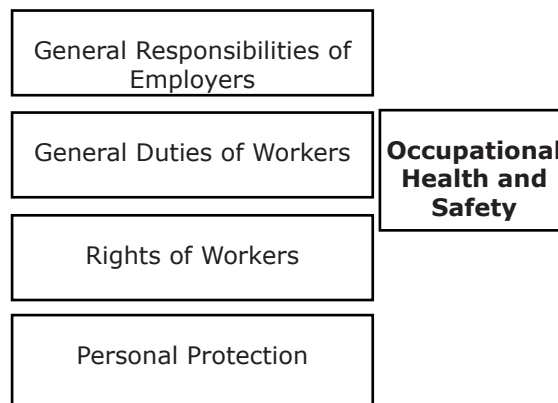
Occupational Safety and Health Management is part of the overall system management which includes organizational structure, planning, responsibility, implementation, procedure, process and resources needed for the development (Fakhri et al., 2014). The implementation, achievement, assessment, and maintenance of the program in the context of risk control related to work activities to create a safe, efficient, and productive workplace (Pangarso et al., 2017).

Research Method

The method used in this research is quantitative with descriptive analysis as presented by Sugiyono (2013) and data analysis techniques using factor analysis as presented by Wardhana & Pradana (2016). Factor analysis is a method of research that aims to identify, classify, and reduce the factors that constitute a variable dimension (Pangarso et al., 2017).

The measurement scale used is Likert Scale with 5 ranges, with 1 for 'strongly disagree' and 5 for 'strongly agree'. The answer in each instrument item has a gradation of very positive to very negative. This scoring and scaling procedure is required for the purposes of quantitative analysis. In general, data analysis techniques are divided into 5 (five) stages, namely coding stage, validity test, reliability test and phase of factor analysis.

Total population in this study is 50 respondents obtained through saturated sampling method (Sugiyono, 2013). There are four factors observed in this research, as seen in Figure 1. All variables are inputted into SPSS application followed by the received data.



Source: **Safety In The Use Of Chemicals**

Figure 1. At Work, Practical Code Of International Labor Organization

Our questionnaire consists of 30 questions or items. The construct is built by taking into accounts the Practical Code of International Labor Organization (1993), then combined with the instruments by Zacharatos et al., (2005) and Yazdani et al., (2015). Responses to all four measures of personal-safety orientation were indicated by 5-points Likert-type scale ranging from

strongly disagree (1) to strongly agree (5).

Result and Discussion

From 30 questionnaire items distributed to 50 respondents, the result of the correlation value is over 0, 279, which means all of the questions are valid and reasonable to be used in factor analysis. Regarding reliability test, the Cronbach’s Alpha value in this study is 0,961, which can be concluded that all of the questionnaires in this study are reliable or consistent since the Cronbach’s Alpha value is > 0,60 (Wardhana & Pradana, 2016). From 30 questions being proposed, the total average response of the respondents is 80,89%, which is considered high value in the category. Therefore, it can be said that the occupational safety and health in PT. Indo Acidatama Tbk. is in ‘good’ category.

We examine the value of KMO and Barlett’s Test Sphericity for further analysis. Figures show KMO Measure of Sampling Adequacy (MSA) is 0,791. The higher MSA number than 0,5 indicates that the variable collection of these factors can be further processed using factor analysis.

Distribution of data processing for research variables is descriptively presented in Table 2.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.791	
Bartlett’s Test of Sphericity	Approx. Chi-Square	442.955
	Df	6
	Sig.	.000

In Table 2, it can be seen that the MSA number of KMO and Bartlett’s Test is 0,791

with the Chi-Square value of 442,955 and 0,000 significance, for the MSA value is over 0,5 and the significance is lower than 0,005. As explained above, those numbers indicate that this study can be continued for the analysis using factor analysis.

It can be seen from Table 3 that MSA value resulted from data processing using SPSS 22 on the indicators in the table above is > 0,5, which means it is still predictable, able to have further analysis, and does not need retesting. The MSA value is seen from the anti-image correlation table with “a” symbol (diagonal direction from top left to bottom right).

	X1	X2	X3	X4	
Anti-image Covariance	X1	.018	-.023	-.010	-.002
	X2		-.023	.044	.007
	X3			-.010	.007
	X4				-.002
Anti-image Correlation	X1	.758 ^a	-.801	-.505	-.074
	X2		-.801	.795 ^a	.221
	X3			-.505	.221
	X4				-.074

Measures of Sampling Adequacy(MSA)

	Initial	Extraction
X1	1.000	.987
X2	1.000	.949
X3	1.000	.976
X4	1.000	.966

Table 5

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings				
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.878	96.948	96.948	3.878	96.948	96.948
2	.091	2.279	99.227			
3	.020	.492	99.720			
4	.011	.280	100.000			

Extraction Method: Principal Component Analysis.

Table 6

Component Matrix ^a	
	Component
	1
X1	.993
X2	.974
X3	.988
X4	.983
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

Extraction Method: Principal Component Analysis.

Based on Table 4, it can be seen that the initial values of all indicators are 1, which means 100% of the variable forms a factor. While the extraction value means the amount of the percentage variant of a variable which can be explained by factors to be formed. For example, on Variable X1, the extraction value is 0,897, which means 98,7% variant of variable 1 can be explained by factors to be formed. This also applies to other variables with the condition of the higher the communalities of a variable, the closer the relation to the factors to be formed.

Based on Table 5, there will be 1 formed factor because only 1 factor has the Eigen value > 1 (i.e. 3,878) that makes total percentage variant of that factor 96,948%. Therefore, it can be concluded that 96,948% of all variables can be explained by 1 formed factor.

Table 6 points the distribution of the four variables on 1 formed factor; while the numbers inside the table are factor loadings which shows the amount of correlation of a variable to one formed factor.

The explanation of Table 6 regarding the factor loading values is in the followings: (1) The correlation between Variable X1 (General Responsibilities of Employers) and formed factor is 0,993, which is classified as strong because the value is > 0,5. ; (2) The correlation between Variable X2 (General Duties of Workers) and formed factor is 0,974, which is classified as strong because the value is > 0,5. ; (3) The correlation between Variable X3 (Rights of Workers) and formed factor is 0,988, which is classified as strong because the value is > 0,5. ; and (4) The correlation between Variable X4 (Personal Protections) and the formed factor is 0,983, which is classified as strong because the value

is > 0,5.

Next is the process of factor naming, which is based on the arguments of the researcher. From the 4 variables processed using factor analysis, a new factor is obtained which is Occupational Health and Safety. It which includes general responsibilities of employers, general duties of workers, rights of workers and personal protection. This factor is labeled occupational health and safety factor because if it is observed from the factor loadings, there are factors which are equally strong and cannot be separated from each other.

Conclusion

Several general issues emerge from our research show that some conceptual, methodological, and practical implications. Based on the study and analysis which have been done, it can be concluded the compliance of occupational health and safety of employees in PT. Indo Acidatama, Tbk. According to ILO's safety in the use of chemicals at work from is classified as 'high'. Results from research analysis are: with the four new formed factors, researcher agreed that general responsibilities of employers, general duties of workers, rights of workers, and personal protection are the most decisive factors which can explain work safety at the company. Those factors are also the most dominant for the existing variable, as discussed in research by Hoyos & Zimolong (2017) and Pradana & Wijaksana (2014). They also have the responsibility to take care of their own health and safety and that of others who may be affected by their acts in the workplace.

These dominant factors labeled as 'occupational health and safety' greatly affect the employees of PT. Indo Acidatama Tbk. They consist of (1) general responsibilities; (2) rights of workers; and (3) personal protections. The 'general responsibilities of employers have extremely strong relation or correlation to occupational health and safety factor It explains that employers are the main aspect of work safety.

The suggestions that can be given for further research is the need to apply a standard assessment of occupational safety and health culture with the reference to number of accidents occurring or violations committed by workers. In the future research, more specifically, authors should examine the limits of a workplace influenced by management

of Occupational Health and Safety (OHS). It would also be a good idea for further research to find out how management of this issue can increase company performance. Our findings here have shown the extensive benefits of high-performance workplace safety systems. However, with respect to occupational safety, this study has confirmed the role of organization is still bigger than individual sensitivity in promoting work safety.

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