Working Period Relationship, Safety Knowledge, and Safety Performance among the Construction Workforce of Light Rail Transit

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ABSTRACT

Introduction: Safety performance refers to an individual safety behavior that can be determined by two groups of factors, environmental and individual. Each company has its own safety performance program for its employees. The company's role in occupational health and safety is to create a positive organizational climate by implementing an occupational safety and health management system. This relates to the organization's commitment to prevent accidents and occupational diseases, and to improve the level of work productivity. This research aims to analyze the relationship between the Working Period, safety knowledge, and safety performance among the workforce of the LRT construction project. **Method:** This research used the quantitative research approach which emphasizes data in the form of numbers and processing by statistical methods. The research design was observational with a cross-sectional approach. The population of this research was 97 respondents who filled in the questionnaires. The independent variables were Working Period relationship and safety knowledge while the dependent variable was safety performance. **Result:** The results show that the Working Period has a negative relationship with safety performance. Safety knowledge has a positive relationship with safety performance. The individual characteristics of the Jabodebek LRT station construction project are based on a Working Period of < 1 year for 38 people. **Conclusion:** Working Period has a weak relationship with safety performance and has criteria which relate to negative relationships. However, the relationship between safety knowledge and safety performance has a positive and significant relationship because the broad knowledge of safety of the employees improves their safety performance.

Keywords: safety knowledge, safety performance, working period relationship

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INTRODUCTION

Occupational Health and Safety (OHS) is one of the most important aspects to consider when improving the performance of employees by providing protection to the workforce so then they can be exempted from the risk of accidents and an unhealthy environment which can affect both the employees and the company. If the company can decrease the harm and risk of working accidents, the stress which can cause harm will decrease, the working quality due to the job itself will increase, and the company will be more effective. This development will improve the working quality, working efficiency, and employee quality, especially among those who are committed to the job.

The factors that are affected by the improvement of Occupational Health and Safety (OHS) in the station project and light rail transit (LRT) depo are the supervision, employee, and environmental factors. However, there is still a lack of Occupational Health and Safety (OHS) management which was noted while planning the OHS for this project. The employee representative was excluded yet the OHS expert, OHS building committee, and other authorized parties were included in the planning process. The exclusion of the employees from the OHS plan affects their awareness of the job's risks, of the danger at the project station, and of the LRT depo, and makes them less concerned about the procedures that have been established. Good communication is needed between the employees and between the employees and the supervisors to improve the employees' safety motivation and safety knowledge so then they can be aware of their safety performance (Panggabean and Nursin, 2019).

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Besides, there is still a lack of emergency response training for the employees which causes a lack of safety knowledge on emergency cases and the job risk. If emergency cases or risks on the job really happen, the employees won't be able to overcome the problem. Instead they will wait for the emergency response team to do the evacuation process.

The lack of safety knowledge of the employees might cause a harmful effect in relation to their performance or in the worst case scenario, death. Another factor that can cause working accidents is harmful performance. The employees' harmful performance, such as not obeying the working procedures and working unsafely, can cause accidents. This statement is supported by Chahyadhi (2019) who proposes that the causes of accident are related to human error, to the company factors, and to the management who are included in the incident. Human factors such as performance, motivation, and psychology (personality) become the concern when improving the safety performance.

Safety performance refers to the individual safety performance which is determined by two factors, specifically the environmental factors and individual factors Individual factors are personality, emotions, intelligence, the principles that are adopted, and experience (Syarifah and Adiati, 2018).

Safety knowledge will affect the company performance. If the safety of the individual meets the standard criteria of the company, the company's performance will be great. To improve the employees' safety knowledge, it is important to offer training which is necessary for employees in the future.

The company's role within Occupational Health and Safety is to create a positive environment by applying the Occupational Safety and Health Management System (OSHMS) as part of the organization's commitment to preventing occupational accidents and occupational disease while improving work productivity (Chahyadhi, 2019). There is always a potential accident risk in every construction project due to the series of activities involved. Big risks are one of the characteristics of the construction sector in which service has an important role in the countries' development, as determined by the government and private companies (Nugroho, Yakin and Bustamin, 2018). Nowadays, there are a lot of companies that are competing to regulate their company's safety. With a high level of safety, there will be a positive impact on company productivity. A company with a low safety performance might incur more working accidents. Low safety performance can be observed in the employees' disobedience when it comes to wearing Personal Protective Equipment (PPE) and not working according to procedure. This disobedience will cause working accidents and interrupt the company's production activity.

Safety performance shows how safe the company is when performing the production process and how organized the workplace is regarding safety performance. Measuring safety performance is done through multidimensional or working accident indicators and the number of individuals almost injured. On the other hand, safety performance can be measured using the safety performance qualitative indicators which consist of safety obedience and safety participation. The development of the safety performance indicators to do this measuring is based on the lack of working accident indicators compared to unpredictable working accidents (Nadhim *et al*., 2018).

Lately, Indonesia has incessantly built up the country's infrastructure, especially in terms of construction and public transportation. One project is the Light Rail Transit (LRT) construction. This aims to reduce the level of traffic and air pollution while also developing the standard of living and economy for people in Jakarta, Bogor, Depok, and Bekasi (Jabodebek). The Light Rail Transit (LRT) station construction is being done 12-17 meters above the ground without stopping the road traffic on the ground. This condition can cause the risk of material falling.

This construction operation, which operates almost 24 hours a day when it is getting closer to the deadline, increases the number of the working accident opportunities during the construction process. This is inclusive of lifting big and heavy materials between 22.00 to 04.00 and even when working overtime until 22.00. This condition can lead to exhaustion due to the long working duration either from morning to night or from night until dawn. As part of the installing and repairing steel process, usually the employees are found to get into accidents, for instance they get squeezed when lifting the steel. This accident happens because of the employees' lack of concentration when they are exhausted, when they are exposed to the sun for a long period of time in a high place, and when they are in working position that is not ergonomic.

Table 1. Data on occupational accident cases in Indonesia in the period 2015 - 2018

Point	Year	Occupational Accident Data
1	2015	105.182 cases
2	2016	101.367 cases
3	2017	123.040 cases
4	2018	157.313 cases

Source: (BPJS Ketenagakerjaan, 2019)

The construction operation explained in the previous paragraph is defined as having long working hours. Long working hours are known to involve working for a length of time that exceeds the standard time of working, yet each country has their own standard time of working to consider (Bannai and Tamakoshi, 2014).

According to the Social Security Provider's (BPJS Ketenagakerjaan) data, the number of occupational accidents in 2015 - 2018 was as follows: in 2015, there were 105.182 accidents with 2.375 dead people. In 2016, there were 101.367 accidents with 2.382 people dead. In 2017, there were 123.040 accidents recorded and in 2018, there were 157.313 accidents (Panggabean and Nursin, 2019).

One of the factors of occupational accidents is the lack of commitment to conducting OSHMS (Rosalita, Ratmawati and Agustina, 2015). The success of Occupational Safety and Health needs recognition from many parties. The introduction of Occupational Safety and Health (OSH), which has a positive impact, is recognized by the government, employers, and workers. The government's role is to protect the employees by issuing policies and rules that support Occupational Safety and Health. One of the policies is Law Number 1 of 1970 on Occupational Safety, which says that the company is obligated to be alert to the working safety requirements and that it should educate its employees to be motivated to apply Occupational Health and Safety while working so then the working productivity increases. This also has a positive impact on product quality (Pramadhan, Yusuf and Iskandar, 2019).

The employees also have the role of supporting the success of conducting the required safety examinations and the success of working by applying the safety performance standards (Syarifah and Adiati, 2018). From the education given by the company, the employees can improve their safety performance while working.

Nowadays, companies are starting to compete with each other by adjusting their safety performance to raise their overall company performance. This is because a company which has a high level of safety performance will realize the positive impact on the company's productivity (Sari, 2017). However, low safety performance can be noticed by the employees who do not wear personal protective equipment according to the rules and who do not work according to the safety performance procedures. This can cause occupational accidents and interfere with the working activity of the company.

The involvement of the employee is the key to the success of the safety program. Based on this research, it was identified that 88% of occupational accidents in the construction project include the unsafe performance of the employees. This statement shows that safety performance is highly related to the people's point of view of the accident risk (Mohammadi, Tavakolana and Khosravi, 2018).

Safety performance shows how safe an organization is, whether all of the procedures are in place, and how safe the workplace is. Safety performance can be measured in a multidimensional manner such as via the occupational accident indicator and almost injured indicator. Apart from that, safety performance can be measured using a qualitative indicator of safety performance and another for safety obligations. The development of safety performance indicator when measuring safety performance is based on the lack of occupational accident prediction indicator and on accidents rarely happening while working (Nadhim *et al*., 2018).

Safety performance, according to Jebb (2015), can be predicted by some factors, for instance: safety climate, safety knowledge, safety motivation, leadership, environmental factors, and individual factors. This explanation supports the research by Rusdiana (2017) which proved that safety knowledge has an important role in relation to the safety performance operators in PT. X. This was where the information acquired by the employees became knowledge that can be implemented while working by paying attention to safety.

The implementation of safe working will change the employees' habit of implementing safety performance. An individual's safety performance can be seen through the employees' obligation to the applied procedures and the participation of the

employees in developing the safety aspects in the workplace. Safety performance refers to individual safety behavior which can be determined by two factors (environmental factors and individual factors).

The individual factors consist of personality, emotions, intelligence, embraced life values, attitude, and experience (Syarifah and Adiati, 2018). It has been mentioned that the individual factors that contribute to the working safety behavior are education, gender, and relationship status. This is supported by the research by Gunawan and Mudayana (2016) who declared that the age and gender of the employees they examined influenced the way that they wore PPE. Age describes the psychology of the employee. Prabarini and Suhariadi (2018) explained that gender affects the individual's behavior according to their gender role and that there are many kinds of environmental expectations resulting in their different behaviors. Men will act rationally, therefore they suit being in a workplace which has a high demand for mental and physical energy.

Education is a factor built into people's personalities. This was proven by the research by Sulistyorini, Rahfiludin and Suroto (2019) who argued that safety knowledge affects safety behavior. Good safety knowledge will increase the awareness and understanding of safety working. Some of the content of safety knowledge needs to be taught, for example, the understanding behind wearing PPE, safe working procedures, the dangers in the workplace, and how to use a simple fire extinguisher (APAR). Wardhani and Refianto (2019) explained that to produce changes to the point of good safety knowledge, there needs to be a plan for the safety management to produce a positive expression of safety performance. Beside that, safety management practices are impactful and increase the level of safety knowledge, specifically safety training, support the spread of the safety information in a good way, and strictly apply the safety procedures and rules. These actions will improve the employees' safety knowledge which also can improve their safety performance, especially the employees' obedience when applying the safety procedure (safety compliance) and participating in safety activities (safety participation).

If the employees have a good perception of the safety aspects and safety in the working environment, they can better obey the procedures. This shows in their daily behavior towards the expected safety requirements (Zahoor *et al*., 2015).

Working period refers to the length of time or duration of someone who has been working in a company, agency or other else (Koesindratmono, 2012). Working period is also related to the duration of someone working in a company. During the working period, someone who has been working from day one until the present should have got a day off to regain their energy from working. However, if someone works without any days off or without rest for long time, it can lead to health problems. Physical stress over a period of time will cause muscle weakness which results in less movement. Physical stress will accumulate day after day over a long period of time, which can cause the employees' health to worsen or result in clinical exhaustion or chronic exhaustion (Koesyanto, 2013).

The research question is "Is there a relationship between the Working Period, safety knowledge, and safety performance among the employees of the LRT project station and depot in Jabodebek?' The aim of this research is to analyze the relationship between the Working Period, safety knowledge, and safety performance among the employees of the LRT project station and depot in Jabodebek.

METHODS

The research design was observational with a cross-sectional approach in which the data was taken at different times in the same company. The data was obtained through a questionnaire, survey, and observations. The research population was all employees of an LRT station as part of the Jabodebek LRT depot construction project and in the LRT depot Kuningan located on H. Rasuna Said Street No. 1, East Kuningan, South Jakarta (12950). The data was taken directly from the field from October to November 2020. Specifically, the population of this research was from 2 LRT stations involved in the building process. In total, there were 97 workers.

The research sample was part of the total and therefore characteristic of the population. The sample was taken through the simple random sampling technique. The dependent research variable was safety performance which consists of safety compliance and safety participation. On the other hand, the independent variable was individual characteristics based on the Working Period relationship and safety knowledge.

The independent variable of the Working Period relationship was measured using an ordinal scale with the following categories: < 1 year, 1 – 2 years,

and > 2 years (Rusdiana, 2017). The researcher conducted the reliability coefficient analysis using Cronbach's Alpha to get the reliability coefficient using SPSS 20. The reliability of each variable was determined using the assumption that if Cronbach's alpha value > 0,6, it means that the variable that has been investigated is reliable.

On the other hand, the researcher also conducted a validity analysis of the questionnaire by comparing the rcount to ttable. The decision was that if the rcount > rtable, then the variable investigated was valid. The measurement of the independent variable on safety knowledge consisted of five questions measured using a Likert scale. The score was from 1 - 4: Extremely disagree, Disagree, Agree, and Extremely disagree. The measurement of the independent variable of safety performance consisted of eight questions measured using a Likert scale. The score was from 1 - 4: Extremely disagree, Disagree, Agree, and Extremely disagree. There were two techniques used for collecting the data, specifically primary data and secondary data. The primary data was collected by direct observations in the field and through interviews based on the questionnaire. The secondary data was collected through a study of the literature and the company's data. A feasibility and ethics test for this journal article was conducted by the Universitas Airlangga Faculty of Dental Medicine Health Research Ethical Clearance Commission, Certificate Number 494/HRECC.FODM/XI/2020.

RESULTS

The Relationship between Working Period and Safety Performance

Based on Table 2, it can be concluded that the employees who have worked for less than a year tend to perform according to a high standard of safety performance. This is shown from the number of respondents.

The employees who had worked for less than a year who performed a high standard of safety performance totaled 34 people (89.5%). In the next step, the Spearman Rank correlation test was applied. Based on the test results, the significance value (p) is 0.011. This value is less than the alpha value (α) of 0,05. It can be concluded that there is a relationship between the Working Period relationship and the safety performance of the employees. The employees' characteristics for the working period on the LRT Jabodebek construction site has a weak relationship with safety performance which means that a longer respondent working period can cause a lack of employee safety performance.

Table 2. Correlation between Working Period Relationship and the Safety Performance of the Jabodebek LRT Station Construction Employees in 2020

Working Period	Safety Performance			
	Low		High	
	n	%	n	%
< 1 Year	4	10.5	34	89.5
1 - 2 Years	0	0	18	100
> 2 Years	9	40.9	13	59.1
Total	13	16.7	65	83.3
Spearman Correlation			0.011	

Table 3. Correlation between Safety Knowledge and Safety Performance among the Jabodebek LRT station construction employees in 2020

Safety Knowledge	Safety Performance			
	Low		High	
	n	%	n	%
Low	10	62.5	6	37.5
High	3	4.8	59	95.2
Total	13	16.7	65	83.3
Correlation			0.0000	

The Relationship between Safety Knowledge and Safety Performance

Safety knowledge is a proximal factor that is person-related to safety performance. Every individual learns through their experiences as a basic tendency based on their abilities and personality which interacts with their external influences (Barbaranelli, Petitta and Probst, 2015). In the work of Rusdiana (2017), it is explained how understanding how to behave safely when working needs knowledge which is obtained while doing the job and through interactions with one's colleagues such as observing and following the leader's performance.

According to Vinodkumar and Bhasi (2010), safety knowledge refers to the employees' knowledge of safety working performance and the procedures necessary to understand the instructions, training, and safe working procedures. Safety knowledge can be measured by checking their understanding of tool usage, their knowledge of the types of work

hazard, and also their knowledge of the prevention of dangerous situations.

Besides following the leaders' performance and having safety knowledge, employees should have the skills to operate the necessary working tools which also has to support the employees' safety. These skills can be obtained by joining the training provided by the company and participating to learn how to use the tools. Therefore, employees who have a greater safety knowledge and level of related skills have a bigger chance of decreasing the number of working accidents. They will demonstrate good safety performance while working.

The number of respondents with a high safety performance and safety knowledge was 56 people (95.2%). After all of the data was collected, the correlation test using Spearman Rank was applied. Based on the test result, the significant value (p) was 0.000. The value number was less than the alpha value (α) of 0,05.

It can be concluded that there is a correlation between safety knowledge and safety performance among the Jabodebek LRT station construction employees. Another result that can be discussed is the correlation coefficient with a result of 0,369. This result shows that safety knowledge has a weak bond with safety performance and it has criteria of requiring a positive relationship. This positive relationship can be described as follows: if the safety knowledge is good, the safety performance will be good as well.

DISCUSSION

The Relationship Between the Employees' Working Period and Safety Performance

Working period is one of the indicators of the employees' tendencies when doing their working activities Siagian and Wasiman (2020). In other words, a long working period indicates more work experience compared to their colleagues. Septiani (2015) explained that the results of her research show that working period has a significant and positive effect on the employees' productivity. In addition, Dwiatmoko (2019) found that there is a significant effect on the employees' productivity. The employees' productivity shows that they have more experience in their work and they also have less accidents which means that their safety performance is applied well in relation to their job. The results from Septiani (2015) and Dwiatmoko (2019) show that the working period factor is related to safety performance.

The impact of Working Period and employees' experience on accident cases has not been definitely concluded because of the different factors that can cause accidents. Employees who have more experience find it easier to understand their environment. On the other hand, they might not be as careful. New employees tend to be more careful. Working Period is related to working experience as well.

Working Period is one of the tendencies of the employees when engaged in working activities. In other words, the longer the Working Period, the more experience the individual has than newer employees (Setiawan and Febriyanto, 2020).

The longer Working Period of an employee shows that they have the ability to control their actions on the job and know the equipment used. This becomes evidence of the employee's ability to do their job. Working Period can be categorized as new if they have worked for less than 5 years. However, if they have already worked for more than or equal to 5 years, they can be categorized as a senior employee (Septiningsih, 2017).

The Working Period relationship is defined as the respondents' Working Period relationship in the Jabodebek LRT construction setting. The Working Period relationship is divided into <1 year, 1-2 years, and >2 years. The Working Period relationship at the Jabodebek LRT construction site is dominated by employees who have worked for less than a year, consisting of 38 people.

Based on the analysis, it is known that Working Period relationship has a weak bond with safety performance, and that it has the criteria for a negative relationship which means that it is inversely proportional. This research has a different result from the work of Siregar and Saridewi (2010) who showed there to be a positive relationship between the Working Period relationship and safety performance.

A longer Working Period relationship means more experience than the new employees, therefore the senior employees understand the working environment better. Employees who understand the working environment will be aware of the risks and potential dangers in the workplace, therefore they could be more careful while working. Employees who have worked for longer can differentiate between safe actions and dangerous actions while working which can prevent occupational accidents.

However, a long Working Period relationship could have a negative impact on working behavior due to the monotone or repeated nature of the work tasks. Job rotation and promotion is therefore needed so then the employees have more working variation (Chahyadhi, 2019).

Based on this research, it can be stated that age, Working Period, and workload are the factors that can affect work performance. Senior employees who are older than 30 years old tend to get weaker which may cause exhaustion and a lack of work performance. This is caused by the employees getting older and their organ functions decreasing. On the other hand, senior employees who have been working for a long time have more work experiences and provide a high level of working performance (Fauziah, Kawatu and Mandagie, 2019).

Negative health outcomes are most likely to be related to extended shifts, high work demands, and overtime working. These kinds of working time will expand the demand for recovery days. Another impact of the long working hours is when the employees prefer the working fewer but longer shifts each week. This may cause a bias in the reporting of health problems due to such a working time arrangement (Tucker and Folkard, 2012).

As the employees who work on the LRT construction are working on a project, they tend to change their work a lot. There is a lot of evidence which highlights that work changes commonly result in a variety of health hazards and health-related outcomes, such as cardiovascular disease, burnout, and depression. These changes to the work include greater job insecurity since they need to adapt more, poorer pay, lowered access to training among the workers, and less control over their working time (James and Walters, 2019).

The Relationship between Safety Knowledge and Safety Performance

A company whose working human labor force has more experience will get more of a profit. Employees who have more working experience will be more skilled at doing their job. To increase the employees' skills, the company should make more of an effort to improve its employees' abilities when they are working. One of the efforts that a company can do is paying more attention to the employees' welfare when working (Hendrayani, 2020). According to the research done by Syarifah and Adiati (2018), safety performance is a working behavior that is related to the employees' safety on the job. In her research, it is shown that the broader someone's knowledge and motivation to do with keeping safe, the higher the obligation that will occur. This safety obligation is shown through the safety working procedure. The individual may have their own perspective about the safety working performance and apply the working procedure to guarantee their safety when doing their job.

The majority of employees at the Jabodebek LRT station construction site have a high safety knowledge and level of safety performance. The results of the correlation show that the Jabodebek LRT station construction employees' safety knowledge has a weak relationship with safety performance and has the criteria of a positive relationship going in the same direction.

This research is similar to the mediation of safety knowledge and safety climate and its effect on the safety management practices and safety performance. Paksi (2018) showed that safety knowledge has a positive relationship and is significantly related to safety performance. To develop the employee's safety performance, the company should support the safety knowledge development of the employees. Safety knowledge can be gained from experience and both formal and non-formal education. In formal education, the knowledge is arranged in a curriculum focused on occupational health and safety. Non-formal occupational safety can be promoted through training, counseling, or their own experience. Regular training will help the employees develop their safety performance, especially when it comes to improving their awareness of the importance of occupational safety (Sulistyorini, Rahfiludin and Suroto, 2019).

Non-formal training has been provided by PT. Adhi Persada Gedung through safety talk events such as toolbox meetings (TBM) which are always done in the morning before work, general safety morning talks (GSMT) held every Fridays, and pre-job safety meetings (PJSM) which are held before the night shift. Internal training is provided for the building and sub-contracted employees of PT. Adhi Persada and it is held before the work starts and while the construction is ongoing. However, if there are any complaints related to Occupational Health and Safety related to the aspects of the owner, the OCG JOPRIS consultant, and if there is a near-miss, internal training should be held immediately to prevent the Occupational Health and Safety complaint, to lessen the likelihood of

a near-miss, and also to remind the employees of the safety knowledge and skills regarding to Occupational Health and Safety. Syarifah and Adiati (2018) explained that the higher someone's safety knowledge and motivation to behave safely, the more that they will obey the rules. Employee obedience is shown through the employees who follow the working procedure safely, who adhere to the occupational safety, and who participate in the Occupational Health and Safety events ran by the company. Rusdiana (2017) stated that creating a safe atmosphere will increase the safety knowledge of the employees. Safety knowledge means that the employees know and understand the meaning of occupational safety, therefore their safety performance awareness will be applied while they are working which guarantees their safety. Increasing the awareness and understanding of safety (such as safety knowledge) is the key intervention to affecting and improving the attitude towards and changing of the employees' safety performance (Sulistyorini, Rahfiludin and Suroto, 2019).

CONCLUSION

According to the research results, it can be concluded that the LRT employees' safety knowledge is high for the majority. The LRT employees' safety performance is also relatively high. The research also shows that Working Period has a weak relationship with safety performance. Safety knowledge also has a weak relationship towards safety performance.

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