



Research Article

# The Relationship between Safety Knowledge and Safety Motivation with Safety Performance among Constructions Workers of PT.X in Bandung Regency

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## ABSTRACT

The prevalence of accidents in Indonesia from 2017 to 2021 has increased from 123,040 cases to 234,270 cases yearly. Individuals need to implement safety performance measures. One of the personal factors that affect safety performance is safety knowledge and safety motivation. This study aims to determine the relationship between safety knowledge and motivation with safety performance among construction workers of PT.X in Bandung Regency. This research was conducted during the PT X construction project at Bandung Regency. The research started in November 2022 and finished in January 2023. This study used a quantitative approach with observational analytics and a cross-sectional research design. The study population consists of 127 construction workers employed by PT X in Bandung Regency. The method used in this research is simple random sampling with a minimum sample size required for this study of 96 respondents. Analytics data used the chi-square test to analyze bivariate data with a significance value of 0,05. The independent variables in this study are safety knowledge and safety motivation, while the dependent variables are safety performance. The result of this research showed that there was a relationship between safety knowledge ( $0.00 < 0.05$ ) and safety motivation ( $0.01 < 0.05$ ) with safety performance. Increasing workers' knowledge of potential hazards, risks, and controls in the construction sector will motivate workers to behave safely in the work environment.

**Keywords:** Safety knowledge, safety motivation, safety performance

## INTRODUCTION

Workers play an essential role in the realization of the goals and continuity of the business. Workers are the company's activities. Workers' protection in terms of occupational safety and health is a priority. Health and safety are two of the most critical factors in a workplace. Without occupational health and safety regulations in a company, the number of accidents in the workplace will increase.



According to data compiled by BPJS Ketenagakerjaan from 2017 to 2021, the prevalence of accidents in Indonesia has increased from 123,040 cases to 234,270 cases per year. The most significant cause of work accidents comes from human factors. Beni Agus Setiono and Tri Andjarwati (2019) explain that workers' lack of awareness in following and implementing occupational health and safety rules is the most significant cause of accidents. Research shows that 80-85% of workplace accidents are due to human behavior (Saraswati et al., 2021). Up to 88% of accident cases occurred due to unsafe action, 10% due to unsafe conditions, and 2% due to other unknown factors.

The most common human factors are joking during the job, being followed by production, not seeing warning signs on the job, needing more information about the equipment that people are using, not reading tool use guidelines, and lacking motivation. Human factors such as knowledge, perception, attitude, and work motivation cause unsafe acts (Vinodkumar and Bhasi, 2010). The most effective way to reduce the number of workplace accidents is through safety behavior. Work safety behavior is defined as positive behavior to prevent accidents that occur as a result of work. The traditional belief that accidents stem solely from mismanagement is evolving. Human factors such as motivation, attitude, and psychology are increasingly being recognized as contributing factors. This result highlights the correlated relationship between the success of OSH management efforts in a workplace and the role of management and workers. Employees play a critical role in supporting the successful implementation of safety behaviors and work success through the effective implementation of safety performance. Effective implementation of safety performance ensures work success but also promotes safety.

Safety performance is indicated by an effort to increase awareness of the importance of safety for themselves, the environment, and the company. Safety performance is determined by management factors and individual factors that affect the implementation of safety performance. Safety performance has a strong relationship with work accidents. If the quality of workers in terms of safety is low, this can lead to accidents (Braun and Clarke, 2006). According to the research conducted by Dita et al., (2019), there is a relationship between knowledge and safety performance, where a worker with a good level of knowledge will show a better safety performance compared to a worker with a low level of safety knowledge. Knowing the potential hazards and accidents in the workplace can make workers aware of safety performance.

The individual factor that affects safety performance is personal characteristics (personal factors) such as education, age, and gender (Salminen et al., 2013). Motivation and knowledge about safety are also positively correlated with compliance. (Syarifah, 2018). Safety performance is a behaviour that has to do with safety and in the same way, it can be conceptualized as a work behaviour in general (Setiono and Andjarwati, 2019). Meanwhile, according to Borman, W. C. and Motowidlo (1993); Neal and Griffin (2000), safety performance is an individual's participation in safety enforcement behaviour in the workplace. Some factors affect safety performance, including knowledge, skills, and motivation.

Workers on the project often do not follow the Standard Operating Procedure (SOP) for Personal Protective Equipment (PPE) due to discomfort, which reduces productivity. Safety knowledge is required in the work environment to avoid potential hazards and accidents (Beni Agus Setiono and Tri Andjarwati, 2019). Safety knowledge is the knowledge of employees about the work safety procedures that the company has established to prevent work accidents. Workers have inadequate safety knowledge, which negatively affects worker attitudes and decreases motivation to use PPE despite its essential functions and benefits..

Work motivation has a significant influence on the safety performance of employees in the construction environment. Once workers are educated about workplace safety, they need to be motivated to continuously implement safety performance in the workplace. According to Frank E. Bird Winarsunu (2008:71-73), six conflicts determine a person's attitude towards work safety, one of which is safety versus group acceptance. The theory states that a worker will choose to perform unsafe actions if a group more accepts an unsafe method than a safe method, then a worker will choose to take unsafe actions. In other words, the higher the group rejection of the safe way, the stronger the motivation to choose unsafe actions. A good work environment is needed to increase safety motivation so workers feel comfortable doing their work.

The risk control of accidents in the workplace is the responsibility of every person. Awareness and commitment from management and each individual are needed to implement safety performance. According to the research by Herlambang (2021), active collaboration and involvement of all individuals in the company are crucial to controlling the risk of workplace accidents. The safety policy and worker's commitment to implementing safety performance are essential in preserving workplace safety (Kouabenan et al., 2015). According to the monthly data from HSE of the PT X construction project in Bandung Regency, 350 incidents of unsafe actions and conditions could lead to near misses over the past three months. Project employees often refuse to follow SOPs when using PPE because discomfort when using PPE reduces productivity. This behavior demonstrates a lack of safety knowledge among workers, which leads to a negative attitude toward using PPE and decreased productivity in the workplace. Workers' motivation to use PPE can be weakened by resistance to the features and benefits of using PPE. Therefore, workers must understand the importance of PPE and be adequately trained in its use. Based on the problem's background, this research aims to determine the relationship between safety knowledge, motivation, and safety performance among construction workers of PT.X in Bandung Regency.

## **MATERIAL AND METHODS**

This research uses a quantitative approach with an observational-analytics research type and cross-sectional design. The research data were collected from November 2022 to January 2023 at PT.X Bandung Regency. The population in this research was 127 workers. All construction workers, both foremen and subcontractors, were included in the population of this research. The inclusion criteria in this study were all construction workers, both foremen and subcontractors, who had received safety induction from the HSE Officer. The sample used in this study was 96 workers. The sampling technique is simple random sampling.

The independent variable used in this research is safety knowledge and safety motivation, while the dependent variable used in this research is safety performance. An instrument in the form of a questionnaire was used to collect the data, including safety knowledge, motivation, and performance. Safety knowledge is a worker's understanding of OHS aspects of PPE and safety behavior during work—a questionnaire measures this variable. The questionnaire about safety knowledge is divided into six questions. The mean value in this variable is 6, with low safety knowledge indicated by a value less than 6. In contrast, employees with a high category of safety knowledge have a value more than equal to the mean value.

Safety motivation is the impulse of workers to perform safe behaviour at work. This variable measured by questionnaire according to the self-determination theory consists of external safety motivation, introjected safety motivation, identified safety motivation, intrinsic safety motivation,

and a-motivation. This questionnaire consists 15 questions divided into favorable and unfavourable items. The mean value in safety motivation is 46. The category is based on the mean value; if the total score shows a value less than the mean value then the safety motivation is categorized as low. Then, if the total score shows results more than equal to the mean value, it is categorized as having high safety motivation.

Safety performance is individual behaviour that creates safety in the workplace, consisting of safety compliance and participation. This study uses safety performance as one variable, not divided into 2 sub-variables. The questionnaire was based on procedures, PT X work instructions, and a modified questionnaire from Vinodkumar and Bhasi, 2010. This questionnaire consists of 10 questions divided into favorable and unfavorable items. The mean value in safety performance is 35. The category is based on the mean value; if the total score is less than the mean value, the safety performance is categorized as poor. Then, if the total score shows results more than equal to the mean value, it is categorized as having good safety performance.

This study used the chi-square test to analyze bivariate data with a significance value 0,05. The chi-square test determined the relationship between the independent variables (knowledge and motivation) and the dependent (safety performance) variables. The results of this study are presented in the form of frequency distribution tables and relationship tables based on research variables, which are explained in the form of narratives.

## RESULTS AND DISCUSSION

### Overview of Knowledge, Motivation and Safety Performance of Workers at PT.X Bandung Regency

Based on the results of research conducted on 96 workers at PT.X Bandung Regency, the frequency distribution is as follows:

**Table 1. Frequency Distribution of Knowledge, Motivation, and Safety Performance**

Variable	Frequency	Percent
<b>Safety Knowledge</b>		
	n	%
1. Low	2	2,1
2. High	94	97,9
Total	96	100,0
<b>Safety Motivation</b>		
1. Low	4	4,2
2. High	92	95,8
Total	96	100,0
<b>Safety Performance</b>		
1. Poor	3	3,1
2. Good	93	96,9
Total	96	100,0

Table 1 shows the frequency distribution of the safety knowledge of 65 respondents, which shows that the safety knowledge level of most respondents is high, with a percentage of 97,9%. Safety Knowledge is measured by looking at safety compliance and participation indicators. Safety knowledge is the worker's knowledge about work safety procedures that the company has set to prevent work accidents. The category of safety knowledge is based on the mean value.

The mean value in this variable is 6, with low safety knowledge indicated by a value less than 6. In contrast, employees with a high category of safety knowledge have a value more than equal to the mean value. Based on the results of interviews with workers, we found that both

foremen and subcontractors had a high level of knowledge because most of the workers already knew about safety compliance and participation. In addition, the management also provides support with health and safety programs that are scheduled by the EHS project, including safety talks and safety briefings.

Safety motivation is categorized as low based on the mean value. This research shows that if the total score is less than the mean value, the safety motivation is categorized as low. When the total score shows results more than equal to the mean value, it is categorized as having high safety motivation. Safety motivation is a person's desire to exhibit safe behavior, which is correlated with changes in behavior (Neal, A. and Griffin 2006). In this research, the motivation variables were measured using a questionnaire instrument with short indicators such as benefits in trying to do work more vigorously, focusing on maintaining or improving safety performance, using safety tools, and the desire to help co-workers when experiencing dangerous conditions. The results based on Table 1 show that most respondents (95,8%) have high motivation. The results show a high level of motivation because workers feel comfortable using personal protective equipment and not because of the orientation of encouragement from coercive others so that workers feel burdened. The mean value in safety performance is 35. The category is based on the mean value; if the total score is less than the mean value, the safety performance is categorized as poor. Then, if the total score shows results more than equal to the mean value, it is categorized as having good safety performance. Safety performance is the quality of employees' work related to workplace safety (Nevhage and Lindahl 2008). Safety performance is characterized by two aspects, namely safety compliance and safety involvement. Safety compliance is related to the extent to which employees continue to try to follow the procedures and regulations set by the organization, for example, using the correct personal protective equipment. Safety involvement is related to how employees try to follow the procedures and regulations set by the organization, for example, using the correct personal protective equipment. Based on the results of research in Table 1, the safety performance of all workers shows the result that the majority of construction workers of PT. X in Bandung Regency has a high safety performance (96,6%). During the interview, it was found that all workers must use safety equipment and be checked by the supervisor before work starts and when work is carried out.

**The Relationship between Safety Knowledge and Safety Performance in PT.X in Bandung Regency.**

The results of the relationship test between knowledge and worker safety performance at PT. X Bandung Regency using Chi-square test are as described below.

**Table 2. The Relationship between Safety Knowledge and Safety Performance**

Safety Knowledge		Safety Performance				Total	
		Poor		Good		n	%
		n	%	n	%		
1.	Low	1	50	1	50	2	100
2.	High	2	2,2	92	97,8	94	100
Total		3	3,2	93	96,8	96	100

*Spearman's rho = 0,00 (<0,05)*

Based on the data in Table 2, it is known that the average worker has a high level of knowledge about workplace safety. A high level of knowledge among workers is an indication of good safety performance in the workplace. Table 2 shows that most construction workers at PT X have good safety performance; 94 workers, with a proportion of 97.8%, have a high safety knowledge

and good safety performance, while workers with high safety knowledge but poor safety performance are 2.2%.

The chi-square test result shows that the knowledge variable with safety motivation has a p-value of 0.00 ( $\text{sign} < 0,05$ ), indicating a significant relationship between safety knowledge and safety performance among construction workers in PT.X Bandung Regency. This research shows that the level of knowledge among workers intrinsically determines safety performance in the construction sector. In addition, the results of research conducted on PT.X construction workers show that workers with high knowledge are more likely to carry out better safety performance than workers with low knowledge. The construction sector has a high potential hazard level, so safety is vital in the construction environment. In order to prevent accidents in project site areas, construction workers need to know the importance of using PPE, operating project equipment according to standard operational procedures, and adhering to OHS policies and rules in the workplace (Purnawinadi, 2019).

Our findings in this research are consistent with Purnawinadi (2019), who found a relationship between knowledge and occupational and health safety programs of the toll road at Lambaye, where workers with better knowledge had better safety performance. Safety knowledge and safety performance are interrelated. According to (Hartanto et al., 2018), a job requires highly knowledgeable workers, leading to exemplary safety performance. An individual's job can cause a risk that triggers an accident, so to prevent bad things, it is necessary to increase safety knowledge.

Safety knowledge is continuously given to workers to encourage the continuous improvement of safety knowledge. This research result shows a relationship between workers' high and low levels of safety knowledge and safety performance. PT X has been conducting a training program on HSE to improve worker's knowledge related to safety. During the interview, the workers stated that they had acquired a high level of knowledge about safety at work. Training and education programs related to safety are essential and underlie a person's behaviour formation before acting. The training is according to the potential hazards in the work area. One of the trainings attended was Behavior-based Safety training. With good safety knowledge, workers tend to show good safety performance. Safety participation refers to behavior that can indirectly improve safety in the workplace. Some actions that show good safety performance are attending toolbox talks every time work starts and attending toolbox meetings once a week with all project human resources.

The results of respondents' safety knowledge are classified as high but poor safety performance; this is because the maximum effort made by HSE as the person in charge of safety differs from the behavior of workers when working at height. The respondent has yet to assess the perceived stimulus provided by the HSE adequately, so the respondent's behaviour is still in the awareness and interest stage. At the same time, evaluation and adoption are uncertain. When the respondent's behavior is still uncertain, workers show unsafe actions. In this case, workers know about safety, but they show unsafe actions such as the platform used as a foothold in working in non-standard conditions. Many workers, especially ACP workers, still need to start using full-body harnesses.

This research shows that there is a worker's construction that has a low safety knowledge but shows a good safety performance; this may be due to the project work environment that has a safe environment; when the work environment is safe, it will increase employees' safety awareness. Therefore, their safety awareness will be applied when they awareness of work safety will be applied when they at work that ensure their safety. Improving awareness and understanding of safety (such

as safety knowledge) is a crucial intervention to influence and improve attitudes and change employee safety performance (Sulistiyorini et al., 2019).

**The Relationship between Safety Motivation and Safety Performance in PT.X in Bandung Regency.**

The results of the relationship test between motivation and safety performance at PT. X Bandung Regency using Chi-square test are as described below.

**Table 3. The Relationship Between Safety Motivation and Safety Performance**

Safety Motivation	Safety Performance				Total	
	Poor		Good		n	%
	n	%	n	%		
1. Low	1	25	3	75	4	100
2. High	2	2,2	90	97,8	92	100
Total	3	3,1	93	96,9	96	100

*Spearman's rho = 0,010 (<0,05)*

Based on the data in Table 3, it is known that the average worker has a high level of safety motivation. A high level of motivation among workers is an indication of good safety performance in the workplace. Table 3 shows that most construction workers at PT X have good safety performance; 92 workers, with a proportion of 97.8%, have a high safety motivation and good safety performance, while workers with high safety motivation but poor safety performance are 2.2%.

The statistical test results between safety motivation and safety performance have p-value 0,01 (<0,05). This study shows that there is a relationship between safety motivation and safety performance among construction workers in PT.X Bandung Regency. The result showed that the average construction worker has a high level of safety motivation. A high level of safety motivation indicates good safety performance. This research shows that the safety motivation is intrinsically related to safety performance among construction workers. PT.X workers explained that the motivation to carry out safety performance is derived from the support of supervisors who care and always remind workers to pay attention to their safety. Provide safety equipment and always remind and reward workers who work safely.

This study's results align with research conducted by by Silahuddin et al., (2018), which states that most workers with high motivation, as many as (79.2%) apply safety behaviour. Based on the theory of Geller and Halimah, shows that motivation arises because of positive reinforcement, namely giving praise, which will encourage a positive form as a form of appreciation of the safety behaviour that has been carried out; the aim is to develop, support and maintain safety behaviour as expected (Scot E, 2001).

The other factor besides safety knowledge in preventing workplace accidents is safety motivation. Safety motivation is when workers are urged to act and behave safely to their safety needs. This research shows that workers with high safety motivation tend to have poor safety performance because the opportunity to use their abilities is absent or not given, so their safety performance will also be poor (Munandar, 2001). In addition, the impact of implementing poor safety performance, even if they have a high safety motivation, is the inconsistency of workers applying safety that can cause an accident on the work site. .

Workers with low safety motivation but good safety performance are caused by the supervision from the management team, supervisors, and HSE. This supervision will provide pressure and stimulus for workers. According to the Self Determination theory (Ryan & Deci, 2000), workers use PPE to get a stimulus from outside (external safety motivation). Workers perform safety behaviour because they feel pressure internally from feelings such as guilt or shame.

According to Uno (2007), motivation is a movement within a person to carry out activities to be achieved. Motivation is fundamental for a person to make changes in himself to realize goals. Work of motivation has a link with job satisfaction. According to research conducted by Chahyadhi (2019), workers with high work motivation have more potential to increase safety performance 0,931 times compared to respondents with low motivation. Someone who has high work motivation will perform well. Someone with high motivation will strive to do the best possible job. According to Wibowo (2007), work on increasing motivation focuses on individual input and work environment. Individual input includes the worker's abilities, knowledge, personality, temperament, feelings, and mood. In comparison, the work context includes the physical environment, the completion of the task, the organizational approach, and the appreciation. Factors include job, pay, satisfaction, rewards and punishment, peer pressure, and incentive programs. In practice, incentives are more effective. Workers tend to repeat actions that receive positive reinforcement through verbal praise of public recognition.

## CONCLUSION AND SUGGESTION

The results showed a relationship between knowledge and safety motivation with Safety Performance in construction workers at PT.X Bandung Regency. Increasing workers' knowledge of potential hazards, risks, and controls in the construction sector will motivate workers to behave safely in the work environment. The relationship between knowledge and motivation in construction workers of PT.X in Bandung Regency is due to the OHS program and previous education and training from other work projects. This study shows a relationship between safety motivation and safety performance among construction workers in PT.X Bandung Regency. The result showed that the average construction worker has a high level of safety motivation. A high level of safety motivation indicates good safety performance. The motivation to carry out safety performance is obtained from the support of forepersons who care and always remind workers to pay attention to their safety. They provide safety equipment and always remind and reward workers who work safely.

This research suggests providing clear rewards and punishments related to occupational safety and health that are not just formalities. In addition, managers also need to be more assertive in implementing standard operating procedures correctly. They should conduct regular evaluations so that workers on the project site can directly implement the process of improving standard operating procedures by managers.

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