

Effect of OHS, Work Accidents, Work Culture and OHS Competence on OHS Performance in National Construction Companies

Rosalendro Eddy Nugroho^{1*}, Agustinus Hariadi DP¹, Mohamad Jihan Shofa²

¹Mercu Buana University, Jalan Meruya Selatan No.1 Jakarta Barat, Indonesia

²Serang Raya University, Jl. Raya Cilegon No.Km.5, Taman, Drangong, Kec. Taktakan, Kota Serang, Banten, Indonesia

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*Corresponding author: Rosalendro Eddy Nugroho

Mercu Buana University, Jalan Meruya Selatan No.1 Jakarta Barat, Indonesia

Abstract

This study aims to determine the effect of OSH work programs, factors that cause work accidents and their learning, culture or work climate, and OSH competencies on safety performance. The populations of this study were employees of PT XYZ which is one of the state-owned construction companies in Indonesia, with a total sample of 110 respondents. The data collection method uses a survey method, with the research instrument being a questionnaire. The data analysis method uses the Structural Equation Model-Partial Least Square (SEM-PLS). The results of the study found that the OSH work program, factors causing work accidents and learning, culture or work climate, and OSH competencies have a positive and significant impact on safety performance. This can be concluded, the better the HSE work program, the factors that cause work accidents and their learning, the culture or work climate, and the HSE competencies implemented, the better the company's safety performance will be.

Keywords: OHS Work Program, Nts and Learning, Work Climate, OHS Competence, Safety Performance.

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INTRODUCTION

Many factors can cause accidents to occur. For this reason, it is necessary to have a comprehensive HSE program as a preventive measure so that accidents do not occur. Accidents that occur are one of the factors that can affect the company's safety performance (Abulhakim, N., & Adeleke, A. Q), [1]. Safety performance can be an indication of how well an organization or construction project is doing in implementing the HSE program in the field, and can be used to evaluate work safety management that has previously been carried out (Aditya, Y., & Indrayadi, M),[2]. The number of accidents/injuries and near misses is the most striking indicator when measuring

safety performance (Alfianto & Allif.) [3]. because work accidents are unpredictable and their occurrence tends to rarely occur in the workplace, they are designated as lagging indicators (Arifuddin, R., Suraji, A., & Latief, Y) [4]. PT XYZ is one of the state-owned construction companies in Indonesia. PT XYZ formed the HSE Department in 2018 with safety performance targets for lagging indicators, namely: FR<2, SR<650, and Zero Fatality.

The novelty of this research is to link Work Culture and OHS Competence to OHS Performance in Construction Companies.

Table 1: PT XYZ Project Accident Data

| NO | Categories | 2018 | 2019 | 2020 |
|------------------------------|------------------------|-------------------|-------------------|-------------------|
| 1 | Nearmiss | 108 | 266 | 167 |
| 2 | First Aid Case | 73 | 215 | 138 |
| 3 | Medical Treatment Case | 4 | 19 | 11 |
| 4 | Restricted Work Case | 0 | 3 | 3 |
| 5 | Fatality | 1 | 1 | 2 |
| 6 | Loss Time Injury | 1 | 4 | 1 |
| 7 | Property Damage | 5 | 32 | 19 |
| 8 | Environmental Damage | 0 | 3 | 0 |
| Kehilangan Hari Kerja | | 6146 | 6543 | 12325 |
| Man Hours (JKO) | | 33.882.615 | 34.269.840 | 25.213.155 |
| Severity Rate (SR) | | 181,39 | 190,93 | 488,83 |
| Frequency Rate (FR) | | 0,177 | 0,905 | 0,674 |

LITERATURE REVIEW

Safety Performance

Construction has unique characteristics when compared to the manufacturing industry. It can even be said that every project in construction is different from one another, by presenting different problems during the process. A construction project is a series of activities that are unique in nature and are only carried out once and are limited by resources in a limited time (Aditya, Y., & Indrayadi, M) [2]. In the series of construction project activities, there is a process that functions to process resources, so that it can become an activity result that produces a work in the form of a building. (Citradewi) [9]. Safety performance can be an indication of how well an organization or construction project is doing in implementing the HSE program in the field, and can be used to evaluate work safety management that has previously been carried out (Armis, A., Bake, J., & Sahrn, S.) [5].

Occupational Safety and Health (HSE)

Occupational safety is a project management target in addition to costs as well as work schedules, because if unwanted and unexpected things occur in a project, for example an accident to workers in the field, it will be directly related to project costs so that in planning the budget, it is necessary to include a budget for occupational safety and health in order to Anticipate if things go wrong (Nugroho, R. E., & Indrayana, D. V)[11]. Safety is an effort to prevent any unsafe actions or conditions that can result in accidents, Occupational safety refers to conditions that are safe or safe from suffering, damage or loss at work (Citradewi, B. A) [9].

Occupational Safety and Health Work Program

The OSH program must be made inseparable from the learning program that must be carried out to apply OSH in carrying out construction project work so that all parties interested in the project understand the conditions of a high-risk project (Oswald, D., Zhang, R. P., Lingard, H., Pirzadeh, P., & Le, T) [12].

Work Accident

Occupational accidents are a direct result of unsafe acts and unsafe conditions, both of which can be controlled by management. Unsafe acts and unsafe conditions are referred to as direct causes (immediate/primary causes) of accidents because of both is a clear / real cause and directly involved when the accident occurred is a clear / real cause and directly involved when the accident occurred. (Chen, W. T., Tsai, I., Merrett, H. C., Lu, S. T., Lee, Y. I., You, J. K., & Mortis, L) [8]. Accident is an incident that is (unplanned) and unexpected which can disrupt production/operations processes, damage property/assets, injure people, or damage the environment. (Bunjamin, P. D) [7].

Culture or Work Climate

Today, work culture and climate have become an important research subject among researchers and consultants in every construction worldwide because safety culture plays a role in preventing accidents on site. (Patel, dan Jha) [13]. The most important factor influencing culture is the commitment from the top of the Organization. Peak commitment the organization can be reflected in the use of PPE that comply, carry out activities according to rules and regulations, can motivate, care about working conditions, provide HSE budget and existing work pressure which in this case relates to Production Targets.

HSE Competence

Competence is a characteristic that must be possessed by someone who will later be measured to find out how the employee's behavior and performance are. One of the factors that can affect performance is competence (Nugroho, R. E., & Indrayana, D. V) [11]. HSE competence is a person's ability and quality related to experience or training or knowledge in the field of safety (Buniya, M. K., Othman, I., Sunindijo, R. Y., Kineber, A. F., Mussi, E., & Ahmad, H) [6].

RESEARCH METHODOLOGY

The hypothesis is a temporary answer to the research problem formulation, where the research problem formulation has been stated in the form of a

question sentence. It is said temporarily, because the answers given are based on relevant theory, not yet based on empirical facts obtained through data collection. So the hypothesis can also be stated as a theoretical answer to the research problem formulation (Sugiyono) [14]. Then set several hypotheses, namely:

- **Hypothesis 1:** It is suspected that there is a positive and significant influence between the HSE Work Program variables (X1).
- **Hypothesis 2:** It is suspected that there is a positive and significant influence between the variables Causing Work Accidents and Their

Learning (X2) on Safety Performance (Y)

- **Hypothesis 3:** It is suspected that there is a positive and significant influence between the variables of Culture or Work Climate (X3) to Safety Performance (Y)
- **Hypothesis 4:** It is suspected that there is a positive and significant effect between the HSE Competency variable (X4) on Safety Performance (Y)

The research flow is shown in Figure 1 as follows:

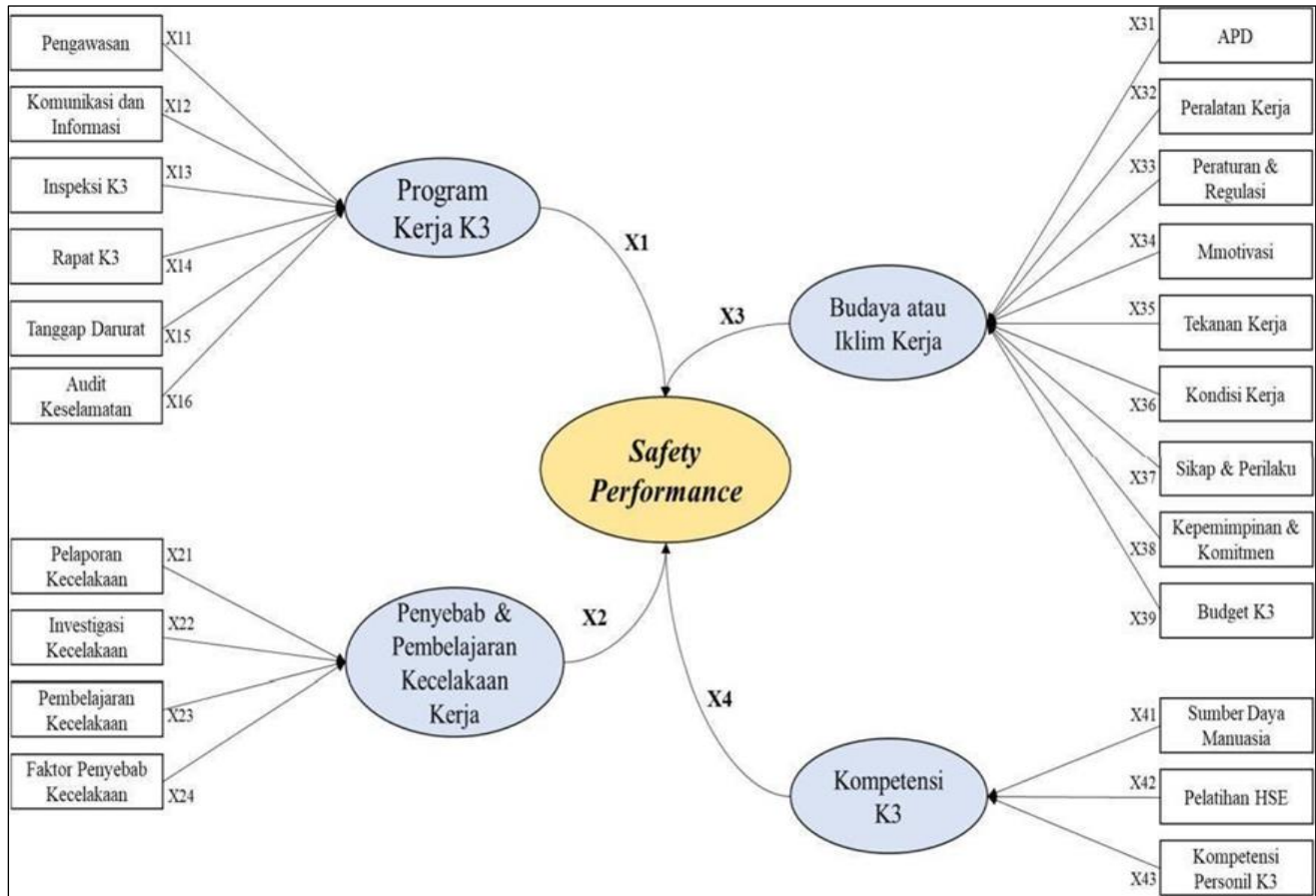


Figure 1: Hypothesis Flow

RESULTS AND DISCUSSION

Structural Model Test Results (Inner Model)

The structural model in PLS is evaluated using R2 for the dependent variable and the Path Coefficient value for the independent variable which is then assessed for its significance based on the T-Statistic value of each Path. The structural model of this research can be seen in the following Figure 2. Structural Model (Inner Model)

Determination Coefficient Test (R2)

After the estimated model meets the Outer Model criteria, then the researcher tests the Structural Model (Inner Model). R-Square (R2) is a goodness-fit model test for endogenous latent variables of 0.67, 0.33

and 0.19 in the structural model indicating that the model is "good", "moderate", and "weak" (Ghozali)[10]. The following is the value of R-Square (R2) in the research construct:

Table 2: Hasil Uji R-Square

| Variable | R Square |
|------------------------|----------|
| Safety Performance (Y) | 0,9997 |

Source: processing data, 2023

Based on Table 2: it can be seen that the R-Square value for the Safety Performance construct is 0.9997. This means that the model has a "good" level of goodness-fit model. Which means that the OHS work program variable (X1), the causes of work accidents

and learning (X2), work culture or climate (X3), and OHS competencies (X4) affect Safety Performance (Y) by 99.97%. While the remaining 0.03% is explained by other independent variables not examined.

Path Coefficients Test

Path coefficients (path coefficients) are used to see the hypothesized relationship between constructs. Path coefficient values that are in the range of values

-1 to +1, where the path coefficient value that is close to +1 represents a strong positive relationship and a path coefficient value of -1 indicates a strong negative relationship. Although values close to +1 or -1 are almost always statistically significant, standard errors must be obtained using bootstrapping to test for significance.

Table 3: Hasil Uji Nilai Koefisien Jalur (Path Coefficients)

| Variable | Safety Performance (Y) |
|--|------------------------|
| K3 Work Program (X1) | 0,339 |
| Factors Causing Work Accidents and Their Learning (X2) | 0,106 |
| Culture or Work Climate (X3) | 0,444 |
| K3 Competency (X4) | 0,192 |

Source: processing data, 2023

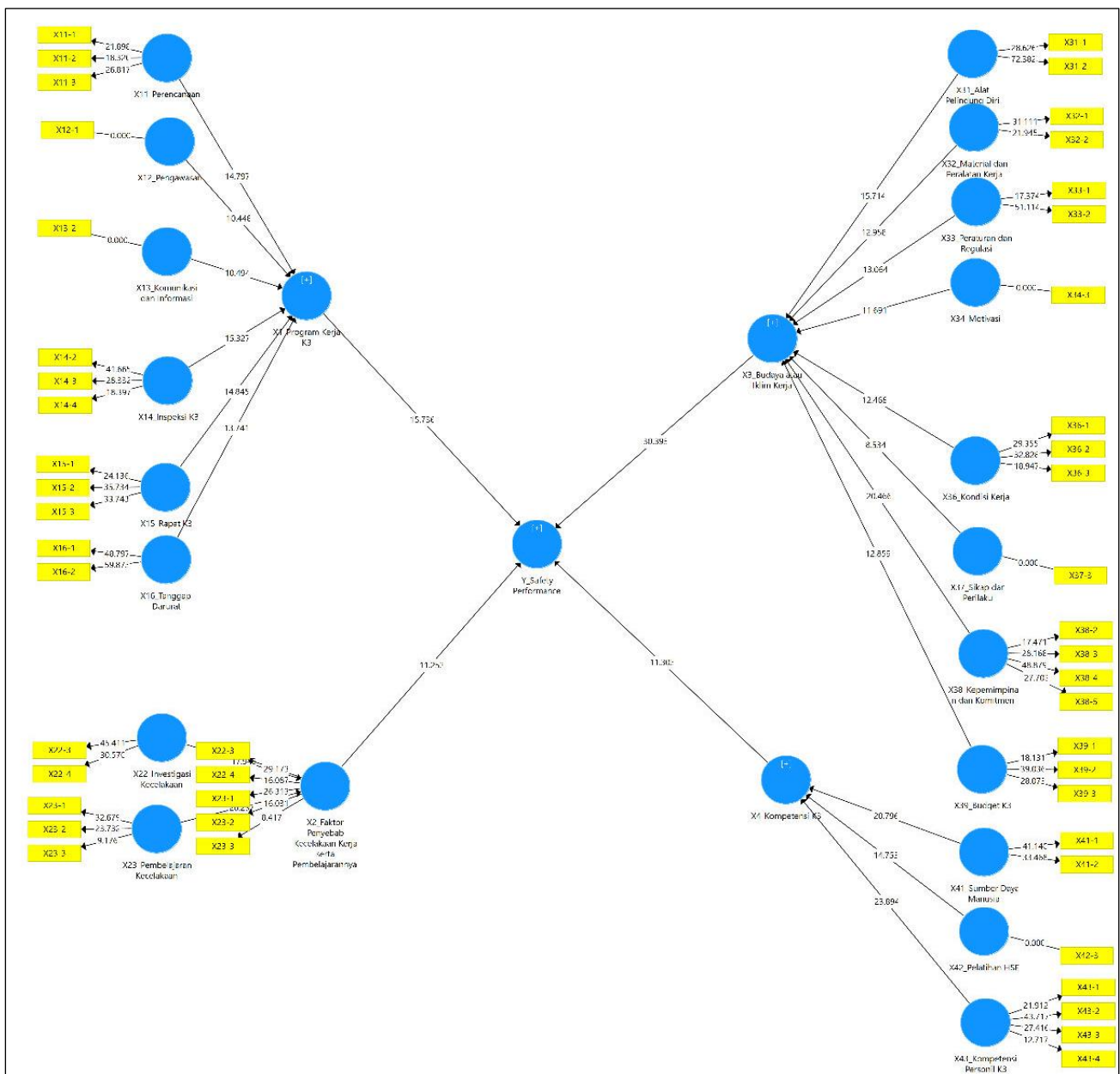


Figure 2: Structural Model (Inner Model)
Source: Results of data processing using Smart PLS 3.0, 2023.

Table 3: shows the test results for path coefficients that have a range of 0.106 to 0.444. It can be concluded that the OHS work program variable (X1), the causes of work accidents and learning (X2), work culture or climate (X3), and OHS competence (X4) to Safety Performance (Y) have a positive relationship because they have a high value. close to +1.

T-Statistic Value Tests

t-Statistic (Bootstrapping) is used to see the significance value between constructs. The limits for rejecting and accepting the proposed hypothesis are

± 1.98 , which if the t-statistic value is in the range of -1.98 and 1.98 then the hypothesis will be rejected or in other words accept the null hypothesis (H0).

Table 4: T-Statistic Value Test Results (Bootstrapping)

| | T Statistics (O/STDEV) | Description |
|--|-------------------------------------|--------------------|
| K3 Work Program (X1) -> Safety Performance (Y) | 15,736 | Significant |
| Factors Causing Work Accidents and Learning (X2) -> Safety Performance (Y) | 11,253 | Significant |
| Work Culture or Climate (X3) -> Safety Performance (Y) | 30,395 | Significant |
| K3 Competency (X4) -> Safety Performance (Y) | 11,303 | Significant |

Source: Results of data processing using Smart PLS 3.0, 2023.

T-Statistic Value Test

Table 4 shows the results of the t-statistic test (bootstrapping) have a range of 11.253 to 30.395. It can be concluded that the relationship between the OSH Work Program (X1) and Safety Performance (Y) was found to be significant with a t-Statistic value above 1.98, namely 15.736; the relationship between the Causes of Occupational Accidents and their Learning (X2) to Safety Performance (Y) was found to be significant with a t-Statistic value above 1.98, namely 11.253; the relationship between Culture or Work Climate (X3) on Safety Performance (Y) was found to be significant with a t-Statistic value above 1.98, namely 30.395; and the relationship between K3 Competence (X4) and Safety Performance (Y) was found to be significant with a t-Statistic value above 1.98, namely 11.303.

Model Fit Evaluation

Evaluation of model fit in this study was carried out using the Goodness of Fit (GoF) to describe the overall level of fit of the model which is calculated from the squared residual of the predicted model compared to the actual data. This GoF index is a single measure used to validate the combined performance of the measurement model (outer model) and the structural

model (inner model). The value of the Goodness of Fit (GoF) index is obtained from average communalities index multiplied by the model's R² value. The GoF value ranges from 0-1 with the following interpretation: Goodness of Fit (GoF) Small GoF = 0.1 Moderate or Moderate Goodness of Fit (GoF) = 0.25 Goodness of Fit (GoF) Great = 0.38 $GoF = \sqrt{0,596 \times 0.9997} = 0,772$

From the calculation of the Goodness of Fit (GoF) above, it can be seen that the result is 0.772. From these results it can be concluded that the performance between the measurement model and the structural model has a large GoF of 0.772 (above 0.38).

Hypothesis testing

To see the results of the significance of the parameter coefficients, it can be calculated from the valid variable dimensions. Researchers want to know if there is a positive or negative and significant or insignificant effect based on the calculation of P Values which must be below 0.05 and the t-statistic is greater than 1.98 (Ghozali) [10]. If the t-statistic is greater than t table (1.98) then both constructs are declared significant and vice versa.

Table 5: Hypothesis Test Results

| Hipotesis Penelitian | Path | Original Sample | T Statistics (O/STDEV) | P Values | Ket. |
|-----------------------------|--|------------------------|---------------------------------|-----------------|----------------------|
| H1 | K3 Work Program (X1) -> Safety Performance (Y) | 0,339 | 15,736 | 0,000 | Positive Significant |
| H2 | Factors Causing Work Accidents and Learning (X2) -> Safety Performance (Y) | 0,106 | 11,253 | 0,000 | Positive Significant |
| H3 | Work Culture or Climate (X3) -> Safety Performance (Y) | 0,444 | 30,395 | 0,000 | Positive Significant |
| H4 | K3 Competency (X4) -> Safety Performance (Y) | 0,192 | 11,303 | 0,000 | Positive-Significant |

Source: Results of data processing using SmartPLS 3.0, 2023

On the H1 hypothesis in Table 5 It can be seen that the relationship between the K3 Work Program and Safety Performance is significant because it has a t-statistic value of > 1.98 , which is 15.736 with an original sample estimate of 0.339 which shows the direction of the K3 Work Program relationship with Safety Performance is positive. From the explanation above, the H1 hypothesis in this study can be concluded that the OSH Work Program has a positive and significant effect on Safety Performance.

On the H2 hypothesis in Table 5 it can be seen that the relationship between the Causal Factors of Work Accidents and Their Learning and Safety Performance is significant because it has a t-statistic value > 1.98 , which is equal to 11.253 with an original sample estimate of 0.106 which shows the direction of the Causes of Work Accidents and Their Learning with Safety Performance is positive. From the explanation above hypothesis H2 in this study it can be concluded that the Factors Causing Work Accidents and their Learning have a positive and significant effect on Safety Performance. On the H3 hypothesis in Table 5. it can be seen that the relationship between Culture or Work Climate and Safety Performance is significant because it has a t-statistic value > 1.98 which is equal to 30.395 with an original sample estimate of 0.444 which shows the direction of the relationship between Culture or Work Climate with Safety Performance is positive. From the explanation above hypothesis H3 in this study it can be concluded that Culture or Work Climate has a positive and significant effect on Safety Performance. On the H4 hypothesis in Table 5. it can be seen that the relationship between OHS Competence and Safety Performance is significant because it has a t-statistic value of > 1.98 , which is 11.303 with an original sample estimate of 0.192 which shows the direction of the relationship between K3 Competence and Safety Performance is positive. From the explanation above, the H4 hypothesis in this study can be concluded that OSH competence has a positive and significant effect on safety performance.

CONCLUSIONS

Based on the results of the research and discussion in the previous chapters, several conclusions can be put forward as follows:

1. The OHS Work Program has a positive and significant effect on Safety Performance, meaning that the better the OHS work program implemented, the better the company's safety performance.
2. Factors that cause work accidents and their learning have a positive and significant effect on safety performance, meaning that if the factors that cause work accidents and learning are carried out well, the company's safety performance will also be better.
3. Culture or work climate has a positive and

significant effect on safety performance, meaning that the better the safety performance, both the culture and work climate applied by the company.

4. HSE competence has a positive and significant effect on Safety Performance, meaning that the better the HSE competency is applied, the better the company's safety performance.

ACKNOWLEDGMENTS

1. The OSH Work Program in the statement with the lowest mean value, namely "My project carries out the LSB Program (Report on Hazardous Sources) regularly", can be increased by requiring it to implement and socialize from the start to all employees or workers who will enter the Project environment, especially workers from the sub and the foreman. Companies need to adjust the targets set if they feel the current targets are too heavy and provide media to make it easier to input data even in conditions in the field. Companies can also implement a reward and punishment system in order to improve discipline according to company regulations.
2. Factors Causing Occupational Accidents and Their Learning in the statement with the lowest mean value, namely "I know and understand the causes of the injured part", can be increased by conducting outreach to all employees and workers about accidents that have or have occurred. When carrying out socialization, it provides an opportunity to ask questions or discuss so that it can measure the level of understanding of the participants. Companies need to conduct socialization in the form of online sharing sessions intended for project management so that the same incident does not happen again.
3. Work Culture or Climate in the statement with the lowest mean value, namely "There is a lot of fatigue (overwork) due to the frequent intensity of overtime", can be improved by providing sufficient rest to employees or workers after carrying out overtime activities, managing the overtime schedule properly and consider adding HR if felt unfinished work because of the high workload and required completion in a short time. Companies need to evaluate the excessive number of overtime hours and consider implementing a shift system if deemed necessary.
4. OHS competence in the statement with the lowest mean value, namely "My project has HSE Training/Training for Leaders or Project Management", can be increased by participating independently to take part in external training to fulfill competence as a leader in the Project. Companies need to

evaluate the competence of all leaders in each project whether it is deemed sufficient and in accordance with company regulations. Companies can carry out routine and systematic independent training to improve the competence of leaders in the HSE field.

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