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Relationship between Safety Climate and Safety Behavior in Company X in Indonesia

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Abstract: Throughout 2019–2021, there was a considerable rise in total work accident cases in Indonesia, increasing from 210,789 to 234,370. According to the location of the incident, accident cases in the workplace also escalated from 139,999 to 144,929. The purpose of this study was to measure the maturity level of the safety climate at Company X in Indonesia and analyze its relationship with safety behavior. This was a quantitative study on a total of 200 respondents using a questionnaire as the data collection method. A structured questionnaire was used to capture the socio-demographic characteristics of respondents, the safety climate, and safety behavior. Respondents participated in this study by responding to the items in the questionnaire distributed. The findings of this study indicated that the maturity level of the safety climate at Company X was at the adequate level with a very strong relationship between the sub-dimensional variables and safety climate. The relationship between safety climate and safety behavior was quite strong. This study emphasized that an increase in the level of safety climate could improve safety behavior. Therefore, increasing safety climate level is effective to reduce the incidence of occupational accidents.

Keywords: manufacturing company; occupational accident; workers

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1. Introduction

1.1. Background

Since the occurrence of major and catastrophic accidents in several industries, the application of occupational safety in industry has developed rapidly. Workers in manufacturing industries often become the victims of work accidents due to personal, organizational, and job factors. Personal factors include alcohol and drug consumption habits, financial situation, self-efficacy, discipline, compliance to rules, and over-optimism. Organizational factors include communication consistency, cultural and safety climate, participation in decision making, employment stability, employee attitudes towards safety, job satisfaction, and safety programs. Job factors include the manager's attitude towards safety, work environment, and workload [1].

The stress experienced by workers can also lead to risky behaviors, so a high number of manufacturing industry workers often ignore safety procedures and regulations [2]. Currently, the success of the implementation of safety management in the company is no longer judged by the decrease in accidents. However, it is assessed by the effectiveness of safety management implementation. Safety management is also measured by how good the efforts towards safety are according to the members of the organization.

According to the data from the Ministry of Manpower of the Republic Indonesia, there were 131.05 million workers in Indonesia in 2021 [3]. This large number of workers will become a valuable asset for the country's development if these workers are excellent in quality and productivity [4]. However, the number of work accidents in Indonesia is still very high and keeps increasing. Throughout 2019–2021, there was a considerable rise in

total work accident cases in Indonesia, increasing from 210,789 to 234,370. Concerning the location of the incidents, workplace accident cases also escalated from 139,999 to 144,929 [5].

Occupational safety for employees is considered one of the main requirements in any organization. A proper working environment cannot be ensured in any organization if the workers are not safe physically and mentally. The purpose of an effective safety program within an organization is to prevent work-related injuries and accidents in the factory area, which can result in enormous human capital losses [6]. Therefore, effective occupational health and safety training is essential to equip employees with the necessary knowledge and skills to be able to work securely and safely [7]. Failure to provide effective training leads to workplace accidents and loss of production, which have proven to be detrimental to the business.

Experts and practitioners have suggested that the prevention of workplace accidents and incidents cannot only be carried out through a management system and engineering approach, but should also include aspects of safety behavior in the workplace. These approaches must be balanced and applied to create a comprehensive and strong safety culture within the organization [8]. Positive perceptions and health measures related to occupational safety will create a feeling of well-being. It is one of the factors that can improve performance. When employees do not feel safe at work, they will not be able to perform their role properly [9].

In recent decades, it has been well documented that a safety climate is associated with safety behavior and accidents in the workplace [10]. Safety climate is employees' shared perception of policies, procedures, and practices related to safety in their work environment [2,11]. Safety climate, according to Cooper and Phillips and Brondino, Silva, and Pasini, is a shared perception of the values, norms, beliefs, practices, and principles of the technical safety of workers in their work environment [4,12]. Safety climate can also be defined as employees' shared perception of safety policies, procedures, practices, and overall safety interests and priorities in the workplace [13].

The purpose of measuring safety climate is to provide opportunities for improvement of the safety performance in the organization being measured [12]. Measuring the safety climate can be compared to taking the "safety temperature" of an organization, providing an overview of the organization's "state of safety systems" at different points in time [11].

Safety climate surveys have several benefits. Firstly, they play a role as a key indicator of safety performance to assist in early identification of accidents, so they will reduce the occurrence of accidents effectively. Secondly, they provide proactive information about safety issues before they develop into accidents and injuries. The analysis of safety perceptions has guided management in developing specific safety programs [14].

According to the performance report of the health and safety environment in Company X from 2016 to 2019, there was a soar in safety observation reports from 292 to 2183. The average number of reports was above 100 reports every month. Then, data on near-miss reports also increased significantly from 7 reports in 2018 to 23 reports in 2019. The significant increment in safety observation reports and near-miss data shows that awareness and participation in worker safety reporting has increased. However, this also depicts a high potential for accidents in Company X. The purpose of this study was to determine the description of the work safety climate at Company X and its relationship with safety behavior. This research focuses on identifying leading indicators to be used as references by companies in planning work safety programs, so safety behavior can be improved. It is also hoped that this research can become a reference for other future research related to safety behavior.

1.2. Literature Review

1.2.1. Safety Climate

Safety climate is employees' shared perception of policies, procedures, and practices related to safety in their work environment [2,11]. Safety climate according to Cooper and Phillips and Brondino, Silva, and Pasini is a shared perception of the values, norms, beliefs,

practices, and principles of the technical safety of workers in their work environment [4,12]. Safety climate can also be defined as employees' shared perception of safety policies, procedures, practices, and overall safety interests and priorities in the workplace [13].

A good safety climate is characterized by a collective commitment of care, where all employees share positive perceptions of the organization's safety features. This collective climate functions as a frame of reference that shapes employee attitudes and behavior. Additionally, the prevailing safety climate influences the outcomes of all organizational safety improvement initiatives [15]. Safety climate is socially constructed by the interaction between people's habits, prevailing practices, the risks associated with their work, and their position and status in the organization.

Health and Safety Environment United Kingdom collaborated with Loughborough University to develop a safety climate measurement method known as the Loughborough Safety Climate Assessment Tools (LSCAST). LSCAST has nine safety climate variables which are used to measure the safety climate in a company. These variables are grouped into three perception contexts, namely perceptions of employees as individuals, members of the organization, and the work environment regarding safety climate values [16].

Employee perceptions as individuals regarding safety values have two indicators, namely individual perceptions of risk and personal priorities in safety. Individual perception in assessing risks in their work environment means individuals have a shared understanding and sense of responsibility in safety matters. Individuals also have beliefs about the possibility of experiencing a work accident. Personal priority in safety means individuals have the opinion that work safety is very important in carrying out work activities. Individuals also understand about work safety related to their work.

Employees' perceptions as members of the organization regarding safety values have four indicators, namely management commitment, communication, safety priorities, and safety procedures and regulations. Management commitment means that management must be able to convince employees about the importance of work safety by creating work safety programs in a sustainable, measurable, and targeted manner. Management should also have a clear work safety policy. Communication means that management is ready to receive opinions and suggestions from its employees. Management also invites employees to make policies and decisions on work safety issues. Safety priority means employees' safety is the main priority compared to production operations. Procedures and safety mean the company has safety procedures and regulations that are easy to understand and very important to implement even though production targets are very high.

Employee perceptions of their work environment regarding safety issues have three indicators, namely co-worker support, physical conditions of the work environment, and work environment involvement. Colleague support means good relationships between individual employees in their work environment who always provide positive suggestions related to safety behavior and working safely. The physical condition of the work environment means management must be able to reassure employees regarding their work environment by delivering a comprehensive safety program, so potential hazards and risks can be identified and controlled. Involvement of work units and all parties in conveying and reporting safety problems, such as reports of unsafe acts, unsafe conditions, near misses, and work accidents, is very important.

1.2.2. Safety Behavior

According to Geller [17], behavior is an action that can be observed by other people. Furthermore, safety behavior is a behavior carried out by individuals as an effort to avoid danger [18]. Safety behavior consists of two components, namely safety compliance and safety participation. Safety compliance is the main behavior that must be performed by workers to maintain safety in the work environment [7]. An example of safety compliance is wearing personal protective equipment while working [19]. Safety participation means behavior that can indirectly enhance safety in the work environment, but can contribute

to develop work safety. An example of safety participation is attending safety-related meetings [7].

1.2.3. Relationship between Safety Climate and Safety Behavior

Several studies related to the relationship between safety climate and safety behavior show different results. Research by Safitri et al. [20] on the drivers of integrated highway buses stated that worker commitment was one of the predictors of safety behavior. In addition, safety communication, learning, and trust in coworkers' safety competence were significantly related to safety behavior. Research by Lyu et al. [21] also found that the safety climate had a positive correlation with safety compliance and safety participation in ethnic minority groups. In addition, Chen et al. [18] reported that safety commitment, safety attitudes, and communication also had a significant relationship with safety participation. In contrast, research by Cooper and Philips [12] and Glendon and Litherland [22] did not prove a significant relationship between safety climate and safety behavior.

2. Methods

This study was designed as a cross-sectional quantitative study. This research used a questionnaire as the instrument in a survey to collect primary data. From a total of 220 questionnaires distributed to respondents, only 90.9%, or about 200 respondents finished the filling of the questionnaire correctly and completely. This study was carried out in a manufacturing company from 15 March to 31 June 2021. The population in this research was all permanent workers, contract workers, and contractors who work in the company environment with a minimum service period of six months.

This study used safety climate as the independent variable and safety behavior as the dependent variable. The safety climate questionnaire used in this research was LSCAST because this questionnaire was in line with the safety climate needs of Company X. This questionnaire consisted of 43 questions from 9 measurement dimensions related to safety climate. There were 4–6 question items for each dimension. Respondents were asked to answer all the questions in the questionnaire. Then, the answers would be analyzed on a 1–4 Likert scale (strongly disagree, disagree, agree and strongly agree). Meanwhile, the safety behavior questionnaire consisted of 9 questions related to workers' behavior in the work environment, such as "I ignore safety rules to complete work". This questionnaire also used the Likert scale from 1 to 4. All items of questionnaire can be seen in Table A1 (Appendix A).

Data analysis was executed by univariate and bivariate tests. The results of the univariate test were frequency distribution, mean, standard deviation, and normal distribution. Bivariate analysis was performed using the Kruskal–Wallis test and Pearson correlation. The Kruskal–Wallis test was carried out to see differences in average safety climate and safety behavior based on demographic factors. The Kruskal–Wallis test was used because the data were not normally distributed. The Pearson correlation test was carried out to determine the strength of the relationship between safety climate and safety behavior. A very strong, strong, and moderate relationship was found if the correlation values were 0.76–1.00; 0.51–0.75; and 0.26–0.50, respectively. Meanwhile, when the correlation value was <0.25, there was no relationship. The significance level in this study was 95% and the α was 0.05. The formulas of average and Pearson correlation test can be seen in Formulas (1) and (2), respectively [23].

$$X = \frac{x1 + x2 + x3 + \ldots xn}{n} \quad (1)$$

$$r = \frac{n(\sum XY) - (\sum X \sum Y)}{\sqrt{\left[n\sum X^2 - (\sum X)^2\right]\left[n\sum Y^2 - (\sum Y)^2\right]}} \quad (2)$$

A validity test was conducted to determine whether the measuring instrument had performed its function properly. A measurement scale is said to be valid if it can accomplish

what it should accomplish and measure what it should measure. A questionnaire item will be considered valid if it has an r value that is greater than the r table. The number of respondents in this study was 200 respondents, so the r table was 0.138 for the significance level of 5%.

A reliability test was performed on the variables of the questionnaire distributed to the respondents, who were Company X's employees. The purpose of this reliability test was to identify and measure the consistency and reliability of the items in the research questionnaire by measuring the variables in question. A variable is measured for its level of reliability based on the Cronbach alpha coefficient obtained. If the resulting Cronbach alpha coefficient is greater than 0.6, it can be said that the items in the questionnaire are reliable [24,25]. Data analysis was performed using SPSS 25.

Based on Table 1, it could be seen that of the 50 items on the questionnaire, 43 items presented a Cronbach alpha value that was greater than 0.6; thus, the questionnaire was considered to be valid and reliable. Seven items were dropped because their Cronbach alpha was less than 0.6.

Table 1. Validity and reliability test results.

Variables	Dimensions	Number of Items	Cronbach Alpha Target	Validity and Reliability Test			Drop	
				Result	Valid	Reliable	Number	Item
Safety climate	**Individual**							
	Risk	4	0.6	0.608	3	3	1	X1·A2
	Safety attitude	4	0.6	0.650	4	4	0	
	Organization							
	Leadership and commitment	6	0.6	0.729	6	6	0	
	Communication	4	0.6	0.643	4	4	0	
	Training	6	0.6	0.714	5	5	1	X2·C6
	Procedure	4	0.6	0.692	4	4	0	
	Job							
	Co-worker	4	0.6	0.713	4	4	0	
	Cleanliness and safety tools	4	0.6	0.708	4	4	0	
	Safety involvement	5	0.6	0.736	4	4	1	X3·C5
Safety behavior	Safety behavior	9	6	0.924	5	5	4	Y2, Y5, Y7, Y8
Total		**50**			**43**	**43**	**7**	

The study was conducted in accordance with the ethical guidelines and regulations applicable and approved by the Ethical Commission for Research and Public Health Service, Faculty of Public Health, Universitas Indonesia, with the issuance of ethical clearance number Ket-106/UN2.F10.D11/PPM.00.02/2021 (date of approval: 30 March 2021).

3. Results

3.1. Respondent Data

The profiles of respondents were characterized based on seven categories: gender, age, education, department, position, employment status, and length of work (Table 2). Out of 200 respondents, 193 were males (96.5%) and 7 were females (3.5%). The majority of respondents were 31–40 years old (33%), followed by 21–30 years old (28%), 41–50 years old (26.5%), less than 20 years (14.7%), and over 51 years old (5.5%). From the perspective of education, it was identified that the educational background of the respondents ranges from

junior high school to postgraduate. The majority of respondents graduated from senior high school (76%). A total of 5% of respondents graduated from junior high school. These workers generally served as implementers or operators in their respective departments. Employees with higher education backgrounds consisted of 25 respondents with bachelor's degrees (12.5%), five with Diploma 3 degrees (10%), and three with master's degrees (1.5%).

Table 2. Gender, age, and education of respondents.

Respondent	N	%
Gender		
Male	193	96.5
Female	7	3.5
Age		
<20 years old	14	7
21–30 years old	56	28
31–40 years old	66	33
41–50 years old	53	26.5
≥51 years old	11	5.5
Education		
Junior high school	10	5
Senior high school	152	76
D3 (Diploma 3)	10	5
Bachelor degree	25	12.5
Master degree	3	1.5

Table 3 presents the distribution of respondents in the six departments in Company X: general affairs, warehouse, engineering, quality, production, and HSE. The production department was the department with the highest number of employees (58.5%), followed by the GA department with 33 people (16.5%) and the warehouse with 32 people (16%). The department with the least number of employees was HSE with only two employees (1%). Meanwhile, the engineering department had ten employees (5%) with four additional employees compared to the quality department, which only had six employees (3%). Most employees of Company X who participated in this study were operators, with a total of 124 employees (62%), followed by staff with 50 employees (25%), supervisors with 20 employees (10%), and managers (3%) as the position with the least number of people. In terms of the employment status, the employees of Company X were categorized into permanent employee, contract employee, and outsourced employee. Most of them were contract employees (47.5%). A total of 34 people (17%) were outsourced employees and 71 (35.5%) were permanent employees.

Table 3. Department, position, and employment status of respondents.

Respondent	N	%
Department		
GA	33	16.5
Warehouse	32	16
Engineering	10	5
Quality	6	3
Production	117	58.5
HSE	2	1
Position		
Operator	124	62
Staff	50	25
Supervisor/team leader/engineer	20	10
Manager	6	3

Table 3. *Cont.*

Respondent	N	%
Employment status		
Permanent	71	35.5
Contract	95	47.5
Outsourced	34	17

3.2. Safety Climate Maturity Level

Table 4 describes the maturity level of the safety climate based on the distribution of individual, organizational, and job dimensions. The average maturity level of the safety climate for the company in the three dimensions was 2.78 and at an adequate level (average value of 2.7–3.0). A more in-depth scrutiny of the dimension showed that the average maturity level of the individual dimension was 2.72. Meanwhile, the levels for the organizational dimension and job dimension were 2.73 and 2.70, respectively. According to Hudson, organizations with a fair safety climate level already have a safety management system and have a very high commitment to running the system. In addition, all potential risks have been identified and can be controlled properly [8].

Table 4. Safety climate dimension average value.

No	Dimension	Code	N	Mean	Median	Std. Deviation	Variance	Level
1	Individual	X1	200	2.720	3.29	0.320	0.104	Adequate
2	Organization	X2	200	2.730	3.33	0.320	0.103	Adequate
3	Job	X3	200	2.704	3.17	0.246	0.061	Adequate
4	Safety Climate	Y	200	2.780	3.27	0.260	0.067	Adequate

Companies that already have implemented an OHS management system can identify and control potential hazards or risks well, so the chance of a work accident is very low [26,27]. The relationship between the three dimensions with safety climate in this company, in general, was very strong, with a correlation value between 0.5 and 0.75, as shown in Table 5. The three dimensions were the determining factors that shape the work safety climate of an organization, including in Company X. The relationship between variables is said to be strong if the Pearson correlation value for the variables is between 0.5 and 0.75 and very strong if the value is above 0.75 [24].

Table 5. Relationship between dimensions and safety climate.

Dimensions	N	Mean	Standard Deviation	Signification	Pearson Correlation	Remarks
Individual (X1)						
Risk	200	3.40	0.408	0.000	0.741	Strong
Safety Attitude	200	3.33	0.325	0.000	0.790	Very Strong
Organization (X2)						
Leadership and Commitment	200	3.42	0.390	0.000	0.752	Strong
Communication	200	3.40	0.360	0.000	0.744	Strong
Training	200	3.33	0.370	0.000	0.780	Very Strong
Procedure	200	3.32	0.390	0.000	0.790	Very Strong
Job (X3)						
Work Colleague	200	3.26	0.4	0.000	0.74	Strong
Cleanliness and Safety Equipment	200	3.3	0.41	0.000	0.76	Very Strong
Safety Involvement	200	3.24	0.42	0.000	0.78	Very Strong

Table 6 describes the safety climate by demographic composition of respondents in Company X. The demographic aspects assessed in this study were education, department, position, employment status, and length of work. A significant difference was identified in the average work safety climate, which was apparent from the *p*-value (sig) of below 0.05. However, no difference was seen in the length of work, meaning that the length of work did not affect the work safety climate in Company X.

Table 6. Safety climate by demographic component.

No	Demographic	n	df (n − 1)	F	Sig	Remarks
1	Education	200	4	27.569	0.000	Different
2	Department	200	5	27.541	0.000	Different
3	Position	200	3	9.207	0.027	Different
4	Employee Status	200	2	9.835	0.007	Different
5	Length of Work	200	3	2.523	0.471	No Different

Table 7 demonstrates the mean value of the safety climate variables by demographic. For respondents with a junior high school education, there were seven variables with below target mean values (μ < 3.12). Out of these, three variables had the lowest mean values, i.e., risk perception (2.845), cleanliness and safety equipment (2.955), and safety involvement variables (2.857).

Table 7. Average value of safety climate variables by demographic component.

Variables	Education					Position				Employee Status		
	JHS	SHS	D3	S1	S2	Opt	Staff	SPV	Mgr	Pmn	Cont	Outs
	μ = 3.121	μ = 3.023	μ = 3.255	μ = 3.274	μ = 3.033	μ = 3.030	μ = 3.058	μ = 3.166	μ = 3.182	μ = 3.112	μ = 3.029	μ = 3.014
Individual												
Risk	2.845	2.937	3.190	3.290	3.320	2.900	3.032	3.310	3.680	3.130	2.880	3.013
Safety Attitude	3.180	2.983	3.400	3.330	3.250	2.972	3.020	3.210	3.460	3.160	2.955	2.972
Organization												
Leadership and Commitment	3.050	3.000	3.320	3.210	3.030	2.990	3.110	3.143	2.747	3.094	2.970	3.070
Communication	3.245	3.000	3.190	3.200	3.250	3.030	2.970	3.156	3.320	3.080	3.050	2.990
Training	3.021	2.920	3.130	3.190	3.030	2.960	2.924	2.948	2.960	2.970	2.940	2.960
Procedure	3.083	2.886	3.246	3.125	2.817	2.921	2.929	2.970	2.9690	3.010	2.890	2.910
Job												
Co-worker	3.040	2.833	3.017	2.990	2.500	2.855	2.880	2.929	2.630	2.870	2.8650	2.810
Cleanliness and Safety Equipment	2.955	2.855	3.054	3.183	2.647	2.860	2.917	3.030	2.830	3.000	2.860	2.770
Safety Involvement	2.857	2.780	3.140	3.033	2.820	2.796	2.820	2.980	2.760	2.910	2.790	2.760

JHS = junior high school, SHS = senior high school, Opt = operation, SPV = supervisor, Mgr = manager, Pmn = permanent, Cont = contract, Outs = outsourcing.

For respondents with senior high school education, the mean values of all safety climate variables were below target (<3.023). Four variables had the lowest mean values: safety involvement (2.78), co-worker (2.833), cleanliness and safety equipment (2.855), and procedure (2.886). In general, those with junior high school, Diploma 3, bachelor, and master education had a fairly good average value compared to those who were senior high school graduates.

Respondents who were operators and staff members had a low average value (3.03) in the safety climate, which was below the average value of the safety climate of supervisor and manager. In this group, four variables presented low mean values: risk perception (2.90), co-worker (2.85), cleanliness and safety equipment (2.86), and safety involvement (2.79). Meanwhile, in the staff groups, the average value was 3.058, with three variables having low mean values: co-worker (2.88), cleanliness and safety equipment (2.91), and

safety involvement (2.82). For those in supervisor and manager positions, the average safety climate values were better than those of other employees (3.166 and 3.182, respectively).

Permanent employees demonstrated the highest average value (3.112) among all employment status groups, while the lowest average was observed among outsourced employees (3.014). Respondents with contract employment status presented the lowest values in four variables, namely procedure (2.89), risk (2.88), co-worker (2.86), and safety involvement (2.79).

3.3. Safety Behavior

An overview of safety behavior in Company X is presented in Table 8. It shows that the average value of safe behavior in Company X was 3.3. Variables with an average value of above 3.3 were included in the category of safe behavior, whereas the values that were below the average were categorized as risky behavior. A total of 117 (58.5%) respondents adopted safe behaviors while 83 (41.5%) were still involved in risk behaviors. This shows that the potential for accidents was still high for employees of Company X.

Table 8. Employee behavior of Company X.

Behavior	Mean	Frequency	Percentage (%)
Safe Behavior	>3.33	117	58.5
Risky Behavior	<3.33	83	41.5

Table 9 describes which variables are included in the category of safe behaviors and risk behaviors. Y1, Y3, and Y4 were deemed as the variables for safe behaviors, while variables Y6 and Y9 were categorized as risk behavior variables. The highest mean value was observed for variable Y3 (3.41), followed by variable Y1 (3.38) and variable Y4 (3.33). In addition, it can be seen that there were several variables for which the average value was below the average value of safe behavior or risk behavior, namely in variables Y6 (3.27) and Y9 (3.28).

Table 9. Safety behavior in Company X.

No	Dimension	Variables	Code	Mean	SD	Variance	Remarks
1	Safety Behavior	I ignored safety rules to get the job done.	Y1	3.38	0.793	0.629	Safe Behavior
		I violated safety work procedures.	Y3	3.41	0.779	0.606	Safe Behavior
		I ignored the safety rules to reach the target.	Y4	3.33	0.784	0.614	Safe Behavior
		The conditions at work forced me to violate safety rules.	Y6	3.27	0.728	0.530	Safe Behavior
		I was under pressure at my job to break the rules	Y9	3.28	0.751	0.564	Safe Behavior
		Average Safety Behavior	**Y**	**3.33**	**0.67**	**0.451**	

SD = Standard Deviation.

Table 10 explains the magnitude of safety behavior based on the education. A total of 83 respondents with senior high school education (70.9%) adopted safe behavior, while the remaining (83.1%) were still involved in risk behaviors. In addition, out of the respondents with bachelor's degrees, 17 (14.6%) had adopted safe behavior while the remaining (9.6%) were still involved in risk behaviors. The number of junior high school graduates who adopted safe behavior and risk behavior was six (5.1%) and four (4.9%), respectively. Meanwhile, the number of Diploma 3 graduates who implemented safe behavior and risk behavior was nine (7.7%) and one (1.2%), respectively. From the data analysis, it can be seen that the senior high school education level had the lowest average value (3.30) compared to respondents who were in other educational groups, although it was almost comparable with the average value obtained by the junior high school group (3.38). The highest mean score was obtained by respondents with Diploma 3 (3.80), followed by those with master's degrees (3.73).

Table 10. Behaviors by education.

Education	N	Behavior			
		Safe	%	Risky	%
Junior High School	10	6	5.1	4	4.9
Senior High School	152	83	70.9	69	83.1
Diploma 3	10	9	7.7	1	1.2
Bachelor Degree	25	17	14.6	8	9.6
Master Degree	3	2	1.7	1	1.2

Table 11 describes safety behavior based on position in Company X. It is apparent that 75 (64.1%) respondents with operator positions behaved safely, while 49 (59%) respondents were involved in risk behaviors. At the staff level, out of 50 respondents, 28 (23.9%) adopted safe behaviors, while 22 (26.5%) were still involved in risk behaviors. The highest risk behavior was found at the supervisor/engineer level (n = 11, 13.3%), with nine people (7.7%) adopting safe behaviors.

Table 11. Behaviors by position.

Position	N	Behavior			
		Safe	%	Risky	%
Operator	124	75	64.1	49	59
Staff	50	28	23.9	22	26.5
Supervisor, Engineer, Team Leader	20	9	7.7	11	13.3
Manager	6	5	4.3	1	1.2

When observed from the perspective of employment status, 39 of 71 permanent employees (33.3%) had practiced safe behaviors, while 32 (38.6%) were still involved in risk behaviors. Among contract employees, 64 of 95 employees (54.7%) had behaved safely, while the remaining 31 (33.7%) were still involved in risk behaviors. Furthermore, out of the 34 outsourced employees, 14 (12%) adopted safe behaviors, while 20 (24.1%) were still involved in risk behaviors (Table 12).

Table 12. Behaviors by employment status.

Position	N	Behavior			
		Safe	%	Risky	%
Permanent	71	39	33.3	32	38.6
Contract	95	64	54.7	31	37.3
Outsourcing	34	14	12	20	24.1

3.4. Relationship between Work Safety Climate and Safety Behavior

A positive relationship between work safety climate and safety behavior was observed in Company X (Table 13). In general, the relationship between work safety climate and safety behavior was quite strong, with a correlation value of 0.25–0.5. The procedure variable had the highest correlation value (0.47) compared to other variables. Meanwhile, the lowest correlation value was observed in the safety behavior variable (0.258). In addition, it can also be seen that the co-worker variable had a positive and quite strong relationship (0.37) with safety behavior compared to the leadership and commitment variables (0.35).

Table 13. Relationship between work safety climate and safety behavior.

Dimensions	N	Mean	Signification	Correlation	Remarks
Individual					
Risk	200	3.40	0.000	0.298	Quite Strong
Safety Attitude	200	3.33	0.000	0.258	Quite Strong
Organization					
Leadership and Commitment	200	3.42	0.000	0.350	Quite Strong
Communication	200	3.40	0.000	0.318	Quite Strong
Training	200	3.33	0.000	0.324	Quite Strong
Procedure	200	3.32	0.000	0.470	Quite Strong
Job					
Co-worker	200	3.26	0.000	0.370	Quite Strong
Cleanliness and Safety Equipment	200	3.30	0.000	0.267	Quite Strong
Safety Involvement	200	3.24	0.000	0.352	Quite Strong

According to Neal and Griffin, a large number of studies have shown that perceived safety climate is positively correlated with self-reported safety behavior and that these two variables are negatively correlated with accidents [28].

4. Discussion

4.1. Work Safety Climate

The results of this study show that the work safety climate at Company X was at an adequate level. At this level, the company or organization must already have a good OSH management system. Company X already has a HSE management system and has an implemented (certified) OSH management system and ISO 45001. Companies that already implement an OHS Management System have the ability to appropriately identify and control potential hazards or risks, so the chance of a work accident is very low [26,27]. This is evidenced by having an average value of risk perception variable of 2.98 and only 41.5% respondents involved in risky behavior. Respondents were able to respond to the items that link to good understanding on risk, such as: "I feel that injuries and accidents have been investigated" (195 respondents or 97.5% answered agree and strongly agree and only 5 or 2.5% respondents disagree).

In managing and controlling risk, Company X has implemented MOC (management of change), PRA (process risk assessment), WRA (workplace risk assessment), and PTW (permit to work system). Furthermore, Company X already has adequate infrastructures and has complied with regulations such as an interlock system for machines, noise control to less than 85 dBa, LOTO implementation, and a continuous maintenance management system. This is strengthened by the fact that 289 (94.5%) respondents are willing to report unsafe acts or conditions, and only 11 (5.5%) respondents are unwilling to report. The willingness of respondents to report unsafe conditions and unsafe acts shows that safety culture has been formed in Company X and that a high level of awareness regarding work safety is also established among its employees.

According to Curcuruto et al., a high level of reporting of near-miss, unsafe behaviors and unsafe conditions indicate that the organization and management are very good and focus on occupational safety and health [29]. Reports on near-miss, unsafe conditions and unsafe behaviors are made using an application that can be accessed by all employees via tablets or computer devices provided in all departments. All observations are then compiled, analyzed, and communicated by the HSE section to all employees every month, so that employees are aware about the potential risks in their workplace and well informed about the progress of improvement.

Management of Company X has also shown good commitment and leadership for OSH, evidenced by the mean value of 3.02 for that variable. The majority of respondents (97.5%) thought that their superiors had good leadership behavior, and 96% agreed that

their leaders had a high commitment to OSH. In addition, 98.5% of respondents also agreed that their superiors led the investigation of work safety issues. If an accident occurs, then the person in charge of the area will be responsible for making a work accident report as well as being the head of the investigation in this case. An investigation team will be formed where the members consist of the HSE, an engineer, and the area PIC. With the formation of this team, it is expected that the root causes of work accidents can be identified so that similar cases can be avoided in the future. In investigating accidents at work, what the employees think about the commitment of their management to safety is as important as how management views their own commitment [30].

Respondents' perception of communication in the work environment was adequate (3.04). This proves that Company X has good communication approaches in conveying the OSH program and its achievements, as well as communicating accidents at work to its employees. Work accident communication is executed through posters posted on each information board in all work departments and distributed to employees via email.

The management of Company X has a long-term OSH program for the period of five years and is reviewed annually to ensure its linearity to the company's business development. This reflects understanding of the correlation between business and OSH among management of Company X. A monthly monitoring through the steering committee for the OHS meeting forum was performed and an HSE meeting forum was also held to discuss program implementation progress, barriers, achievements, and potential risks.

The management of Company X is very strict with its employees in terms of OSH implementation and they apply a reward and punishment system. The majority of respondents (98.5%) agreed that their superiors take firm actions against workers who do not comply with the OSH regulations. According to the Health and Safety Executive, reward and punishment system is a form of consequence received by workers because of their behavior [27]. A reward is a form of positive reinforcement, while punishment has undesirable consequences. Zohar has shown that work injuries and accidents can be reduced by improving supervision practices and providing rewards [2]. Rewards given by Company X to employees include compliments, shopping vouchers, certificates, and job promotion. Examples of punishments are suspension, postponement of salary increase, and postponement of bonuses. Cahyani stated that reward and punishment for workers can encourage workers to perform safe behavior at work. This reward and punishment program encourages workers to carry out BBS, raise awareness on OSH, and behave safely at work [31].

Management invites and encourages all employees to always work according to the safety regulations, use safety equipment that has been provided, and behave safely. This makes employees perceive that management is very committed to safety issues and prioritizes safety over the production process. When employees feel that management supports their daily efforts and provides the resources and information needed to carry out their jobs effectively and safely, the work safety climate is said to be good [32].

A good management system is also supported by leadership behavior and good communication. According to De Koster, good leadership behavior towards subordinates is very crucial and will affect work safety performance [33]. Leadership can motivate and serve as role models and can help employees understand the importance of implementing the OHS program [34,35]. Supervisors and managers in Company X have a regular schedule and periodically conduct safety observations in the workplace; observe the work processes of machines and employees; and observe existing facilities and infrastructure. In addition, dialogues are held with employees regarding work behaviors, procedures, and potential risks in carrying out their duties. This is conducted to discover to which extent workers understand the hazards and risks around their location and how to control them. The identification of potential risks and hazards is always included in the work safety program which is discussed intensively in the Steering Committee of the OSH forum, involving employees and management in decision making.

Communication is very important in building work safety culture and climate. Lin et al., in their study, mentioned that employee awareness, competence, and communication on OSH are important factors in shaping the work safety climate [36]. In line with these findings, a study conducted by de Castro Moura Duarte et al. revealed that communication is an important element in building a work safety climate [37]. Employees' perceptions of safety communication in Company X are good, including open discussions on work safety issues in respective workgroups and with the superiors. In addition, 98.5% of employees mentioned a good perception. They also believed that management would take strict action against employees if they violated safety regulations. In addition, management always provides complete information if there is a change in work that has a higher risk than before. Management will carry out risk analysis and assessment first to ensure the new work process is safe and secure for employees. OSH communication is performed by Company X through various approaches such as posting OSH signs, OSH posters, safety talks, safety data sheets, BBS reports, OSH performance reports, work accident reports, work accident investigations, and OSH training. Improved communication between line workers and supervisors resulted in a decrease in micro-accidents and an increase in the use of PPE [2].

OSH training is one of the important components in shaping the work safety climate. Based on the measurement of the questionnaire, the average value of training in a work safety climate is adequate (2.95). This shows that the management of Company X is also focused on educating and fostering its employees. It is revealed that 98% of employees perceived that safety training has been provided in their workgroup, and 95% of employees admitted that they have received training if there is a change in work assignments and they have sufficient time to receive this training. OSH training is given to employees to improve and add to their knowledge and skills, and change their behavior when carrying out their work so that they adopt safe behaviors to increase productivity [38]. The Health and Safety Executive stated that providing training helps workers to work safely and does not pose a risk to their health [27]. Company X provides safety training to its employees according to their work assignments, matrix competencies, and skills. The majority of respondents (98%) stated that they have received adequate safety training, such as basic safety training (BST), first aid, firefighting, use of PPE, identification of hazards and risks, hazardous toxic materials (hazmat), safety data sheets, risk assessments, LOTO, work permit system (PTW), et cetera. Training is also provided if there is a change in work assignments or job rotation because employees have to learn the processes and procedures for operating different machines, different chemical usage, and different PPE according to the various levels of hazards and risks. Leaders must ensure that their employees have received appropriate training for their jobs and duties. In addition, 94.5% of employees thought that the training is delivered in a clear and easy-to-understand manner, 97% of employees thought that they have been trained and skilled in carrying out their duties according to the work procedures, and only 3% of respondents answered that they do not know how to use safety equipment according to procedures.

Complying with safety regulations and work procedures is one of the important factors indicating the work safety climate that can prevent potential work accidents or injuries in the workplace [39,40]. Based on the measurements obtained using the questionnaire, the average work procedure (2.93) in the work safety climate in Company X was at an adequate level. Work procedures and safety regulations in Company X are provided in simple language and easy to understand by workers. The results of the questionnaire show that 96.5% of respondents feel the work procedures are easy to understand, with 96% of respondents having been trained to carry out their duties according to procedures and 97% knowing how to use safety equipment according to procedures. Meanwhile, 95.5% of respondents obeyed safety procedures when performing their role.

From the average work safety climate in general, two variables have a low average value, i.e., co-worker (2.86) and safety involvement (2.81) variables. There are still 7% of respondents who feel that their co-workers have not been able to properly indicate

unsafe conditions; 5% stated that their co-workers have not been able to take work safety problems seriously and 3% of respondents showed a lack of commitment to improving safety. This can be caused by workers' education factors; a lack of knowledge in identifying hazards and risks; a lack of experience and years of work; or a lack of concern for the work environment. Racicot et al. argue that the support and guidance received from colleagues helps in socialization, task development, and higher quality interpersonal relationships [32]. A higher level of co-worker support is more pleasant, leading to greater job satisfaction. In addition, it is also important for supervisors to improve safety communication with their team through safety talks and tier meetings to increase commitment, awareness, and safe behavior at work [10]. A study in Italy conducted by Brondino, Silva, and Pasini proved that the support of colleagues in a work safety climate can strongly influence the safe behavior of workers around them [4].

Education is the basic foundation for a worker's level of knowledge. Workers who have higher education certainly have sufficient knowledge and have good safety behavior. According to research results by Liang and Zhang [34] and Ruch [41], workers who have had a higher education refuse to violate safety regulations even in limited conditions because they understand the risks and dangers of violating them. The results show that workers who have more knowledge about the product, organization, or company goals/targets engage in safer work behavior [42]. On the other hand, workers with low education and less work experience more often violate work safety regulations when performing routine work [43]. They are very vulnerable to becoming victims of work accidents and injuries due to their lack of skills and work experience.

Based on the results of the work safety climate questionnaire according to the position, the lowest average score was for the operator position (3.03), while the average for other positions was higher, such as staff (3.08), supervisor (3.166), and manager (3.182). This is in line with the research of Findley et al. [30] and Pinion [44], which stated that there were differences in work safety climate scores based on position. Foremen had the lowest work safety climate perception scores, followed by operators, staff, supervisors, and managers.

The low average value of work safety climate for operator and staff employees was found in the variables of co-worker support, procedures, training, lack of maintaining cleanliness and work safety equipment, and safety involvement. Based on the observations in the field, it can be seen that operators are very busy with their respective work routines, pursuing set targets, so they pay little attention to the surrounding work environment. Apart from that, there is a lack of awareness in maintaining the cleanliness of the work area and checking personal protective equipment. This is related to the operator's knowledge, insight, and work discipline. Because they are tied to production targets and daily work routines, operators also have minimal participation and involvement in work safety activities.

Based on employee status, the average score of safety climate in permanent employees (3.12) was higher than direct contract employee status (3.029) and outsourced employees (3.014). This is because permanent employees have longer work experience, are familiar with the work environment, receive more OHS training, and already understand the OHS management system compared to other employee statuses. This finding is in line with the argument from Hald [42] that workers who have a lot of knowledge about the company's product, organization, targets, and customers engage in safer work behavior.

4.2. Safety Behavior

In general, the safety behavior at Company X had a mean value of 3.31 and was at a good level. Out of the five variables contained in the behavior of survivors, three variables were above the average value (3.33): Y1 (3.38), Y3 (3.41), and Y4 (3.33) variables, while the other two variables, Y6 (3.27) and Y9 (3.28), were below the average value (3.33). Because the value of the two variables was below the average, they were referred to as risk behaviors. Both variables were related to conditions in the workplace and working under peer pressure. This is in agreement with a study from Hall, which suggested that

organizations that can address work environment factors and individual problems (such as work design and organizational climate) can create broader overall strategies to develop a safer workplace [45]. Copper and Phillips stated that most of the causes of work accidents were due to unsafe behavior with a percentage of 80–95% [12]. Unsafe behavior occurs because of the perception and belief of workers. They feel they are experts in their fields. They also feel that they have never had a work accident, so there is less concern for working properly and correctly.

A poor safety climate results in decreased compliance with safety procedures and leads to an increase in workplace accidents [10]. The majority of workers understand that work accidents are the result of unsafe behavior such as not using PPE properly and operating machines without proper procedures. Borman and Moto Widlo distinguish two types of safety behavior: compliance and participation. Safety compliance refers to the core activities that individuals need to perform to keep the workplace safe [46].

Educational factors influenced safety behavior at work. Employees who had low education levels were very vulnerable to engaging in risky behavior compared to employees who had higher education levels. These findings agree with the research by Gyekye and Salminen [14], which showed a positive relationship between education and safety climate. Highly educated workers had the best perceptions of safety, showed the highest levels of job satisfaction, were the most compliant with safety procedures, and had the lowest rates of accident involvement. The research by Liang and Zhang [34] stated that workers with a low level of education were more likely to violate safety rules under situational constraints. Meanwhile, workers with less work experience were more likely to commit routine violations. Workers with a low level of education need to be informed about the safety risks stemming from safety violations. Workers with less work experience can be trained through an apprenticeship system. It could ensure they are able to balance the relationship between safety and production.

In general, it could be seen that there were workers who carried out risky behavior in almost all positions. The levels of positions that performed the most risk behavior were operators (59%) and staff (26.5%). The risky behavior conducted by them stemmed from working under pressure from colleagues and the conditions in the workplace which forced them to violate safety regulations. This is because operators and staff are dealing directly with sources of danger and are involved in high-risk activities. The sources of danger are rotating machines with mechanical hazards, contact with chemicals, strong odors from chemicals, ergonomic problems (lifting and carrying activities), and so on. Apart from that, there are several old machines and infrastructure, so they cannot work normally. Recurring problems (such as product seepage through pipes, nozzles, and hoses) are problems that operators and staff always face. They have to operate the machine under these conditions to achieve the targets. Based on our analysis, this is caused by a lack of knowledge and unsafe work locations.

Based on data analysis, it can be seen that the highest contributing factor in carrying out risky behavior was permanent employee status (38.6%) and direct contract employees (37.3%). The majority of risky behavior performed was violating safety regulations to achieve targets and violating safety rules related to unsafe conditions in the workplace. Permanent and direct contract employees who commit violations are operators and some supervisors. Operators, as the front guard in the manufacturing process, deal directly with sources of danger and risk. Exposure to the risks faced and the demands of targets that have been set force operators to commit violations, especially if there is pressure from their supervisors.

The relationship between safety climate and safety behavior at Company X was positive and quite strong. All variables from the safety climate dimension showed numbers in the range of 0.25–0.5. A high safety climate is positively related to safety behavior among workers, which can influence the adoption of safety behavior and safe practices as well as employee job satisfaction and performance. The results of this study strengthen the research by Liu et al. [10], which stated that safety climate predicted safety behavior. Safety

behavior mediates the relationship between safety climate and work accidents. Safety climate can influence workers' behavior and reduce the risk of accidents. Research by Tholén et al. [47] indicated that individual perceptions of safety climate exerted a causal effect on individual safety behavior.

4.3. Practical Recommendations

To increase the safety behavior among workers, we should enhance the safety climate. Safety climate improvement strategies can be carried out through individual dimensions, for example, training related to identifying potential hazards, risks in the workplace, and risk management. The audit reporting program can also be an effort to reinforce individual dimensions.

Safety climate development strategies can also be executed through organizational dimensions such as communication and procedures. Examples of enhancements in terms of communication are routine safety talks at the beginning of each work shift and providing special information boards for work safety issues. An example of improvement in terms of procedures is ensuring that all safety and work procedures are up to date, documented, and reflect actual work processes. In addition, reinforcement efforts can be made by providing a place to store safety procedures so they can be easily obtained and searched by operators.

Safety climate improvement strategies can also be carried out through job dimensions such as cleanliness and safety equipment and safety involvement. Examples of improvements in terms of cleanliness and safety equipment are providing adequate PPE, providing storage for PPE, training on the use of PPE, and improving the administration of recording PPE use to find out how long PPE has been used. An example of improvement in terms of safety involvement is increasing dialogue with operators regarding work safety to find out the problems they face.

4.4. Limitation

The limitation of this research is only focusing on one company. However, the safety climate is generic. Therefore, other companies that have the same business processes as Company X can use this research as a reference for improving the safety climate. Apart from that, this research can also be a guide for future research where it can be executed on companies with many branches (both at the national and international levels).

5. Conclusions

The work safety climate at Company X was at an adequate level, while the safety behavior at Company X was at good level. The relationship between safety climate and safety behavior at Company X was positive and quite strong. To increase the safety behavior among workers, we should enhance the safety climate. Safety climate improvement strategies can be carried out through individual dimensions (such as training related to identifying potential hazards), organizational dimensions (such as routine safety talks at the beginning of each work shift), and job dimensions (providing adequate PPE).

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Appendix A

Table A1 consists of 50 items used in this research to measure safety climate and safety behavior.

Table A1. Items used to measure safety climate and safety behavior.

No	Question Items	Response			
		Strongly Disagree	Disagree	Agree	Strongly Agree
	Part 1 (Individual)				
	1A (Risk)				
1	I feel that work injuries and accidents have been investigated				
2	Findings, issues, and improvements related to HSE are not followed up				
3	Pausing and thinking about safety risks when making decisions at work is not good practice				
4	I am trained to report unsafe acts and/or conditions without fear of negative consequences				
	1B (Safety Attitude)				
1	Working safely is my responsibility				
2	I don't know how to access safety procedures to do the job safely				
3	Hazard evaluation is executed before carrying out work				
4	I understand the dangers of non-routine tasks before doing the work "Non-routine tasks" means work activities that are generally not performed on a regular basis (daily, weekly, monthly). These also do not have written procedures for performing the work correctly and safely				
	Part 2 (Organization)				
	2A (Leadership and Commitment)				
1	My supervisor does not implement work safety procedures in my work group				
2	My supervisor takes a proactive stance when it comes to safety				
3	My supervisor shows leadership so that employees remain focused on work safety				
4	My supervisor leads an investigation regarding a safety issue				
5	My supervisor is not committed to improve the workplace safety				
6	My supervisor does not emphasize safety at work				
	2B (Communication)				
1	Work safety issues are discussed openly between my supervisor and my work group				
2	My supervisor takes strict action when a worker does not follow safety rules				
3	My supervisor does not inform my work group about work safety rules				
4	My supervisor notifies my work group if there are changes to work procedures that affect safety issues				
	2C (Training)				
1	There is adequate safety training in my work group				
2	Employees do not receive safety training when there is a change in work assignments				
3	Provide sufficient time for safety training				
4	My supervisor ensures employees receive adequate safety training				
5	Safety training is not delivered in a clear manner				
6	I understand how to do the job safely				

Table A1. *Cont.*

No	Question Items	Response			
		Strongly Disagree	Disagree	Agree	Strongly Agree
	2D (Procedure)				
1	Work safety procedures are difficult to understand				
2	Employees are trained to carry out their duties safely according to work procedures				
3	I don't know how to use safety equipment according to standard work procedures				
4	I follow safety rules and procedures properly when doing my job				
	Part 3 (Job)				
	3A (Co-workers)				
1	My co-workers always follow work safety procedures correctly				
2	My co-workers were unable to quickly pinpoint unsafe workplace conditions				
3	My co-workers take safety issues very seriously				
4	My co-workers are not committed to improve workplace safety				
	3B (Cleanliness and Safety Tools)				
1	Employees in my work group are provided with adequate safety equipment				
2	No efforts are made in my work group to create safe working conditions				
3	Safety equipment in my work area is checked to ensure it is error-free				
4	Unsafe conditions in my work area were not corrected				
	3C (Safety Involvement)				
1	At my workplace, the people doing the work are involved in determining corrective actions				
2	My supervisor does not regularly discuss workplace safety issues with employees				
3	My supervisor promotes employee involvement in matters related to work safety				
4	My supervisor does not respect employees' ideas regarding work safety issues				
5	My supervisor gets employees involved in safety issues				
	Part 4 (Safety Behavior)				
1	I ignored safety rules to get the job done				
2	I do not engage in prohibited activities				
3	I violated safety work procedures				
4	I broke safety rules to reach the target				
5	I get the job done faster by not breaking some safety rules				
6	Conditions at work forced me to violate safety rules				
7	I take shortcuts with little to no risk				
8	I do not violate work safety procedures even under pressure from management				
9	I am under pressure from my coworkers to break the rules				

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