

# The Relationship between Safety Leadership Style and Safety Climate in Phosphoric Acid Industry

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## ABSTRACT

**Introduction:** Phosphoric acid companies have risks that can lead to work accidents. There are several factors that influence the occurrence of work accidents, one of which is organizational and management factors. Leadership style is a factor in the work safety climate which leads to work accidents and work productivity. The purpose of this study was to analyze the relationship between leadership style and work safety climate in the Phosphoric Acid Plant at Phosphoric Acid Industry. **Methods:** The type of this research is descriptive quantitative research and through a cross-sectional approach to 44 workers at the Phosphoric Acid Plant. The variables of this study including safety leadership style and work safety climate. The data collection method used was secondary data obtained from the company's annual data and as well as the primary data using the Leader Behavior Description Questionnaire and the Nordic Safety Climate Questionnaire. Each variable dimension was analyzed using the Spearman correlation method. **Results:** The results indicate that most workers, 47.7%, have both very high consideration and high initiating structure leadership style level. There is a relationship between leadership style and work safety climate with a correlation coefficient of 0.787 and shows a strong positive correlation. **Conclusion:** There is a strong positive relationship between leadership style and safety climate.

**Keywords:** leadership style, phosphoric acid plant, safety climate

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## INTRODUCTION

The International Labor Organization (ILO), has established namely ILO Centenary Declaration for The Future of Work. This commitment focuses on occupational health and safety (International Labor Organization, 2020). The commitment aims to provide better handling, especially on occupational safety and health aspects for the workers. This agenda was ratified and adapted by more than 70% of ILO member countries by integrating aspects of occupational health and safety in corporate governance. The implementation of occupational health and safety programs is important because, according to the International Labor Organization (ILO), there are around 600,000 lives that can be saved every year if companies implement occupational health and safety systems and programs. However, in reality, according to global estimates in 2017 it is stated that annually there are 2.78 million cases of fatal occupational accidents

and diseases and 7600 work-related deaths per day worldwide (International Labor Organization, 2019).

There are several factors that influence the occurrence of work accidents. One of these is organizational and management factors, of which there are several aspects such as management commitment, education, job satisfaction, supervision, and awards. Safety supervision is one of the key factors in work accidents (Jafari *et al.*, 2017). Leadership is a descending hierarchical influence process performed from a single individual through the work teams (Zhu *et al.*, 2018). Leadership style factor could improve work safety climate in a company. This occurs if the company has a good work safety climate as well. For example, the transformational and transactional leadership styles possessed by occupational health and safety managers can improve the occupational safety and health climate in the company also decreasing work accidents and increasing the productivity (Shen *et al.*, 2017).

This Phosphoric Acid Industry, as a phosphoric acid company, has an annual production capacity of 600,000 Metric Tons per Year (MTPY) of sulfuric

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acid, also 200,000 MTPY of phosphoric acid, and 500,000 MTPY of purified gypsum. But, in 2019, the achievement of sulfuric acid production was 545,906 MTPY, then 116,111 MTPY phosphoric acid, and 426,361 MTPY purified gypsum. Meanwhile, in 2020, the achievement data for sulfuric acid production is 591,695 MTPY, followed by phosphoric acid production achievement, which was 113,798 MTPY, and the production achievement of purified gypsum which was 481,811 MTPY.

From identifying the annual production capacity of the company and the production achievement in 2019 and 2020, it can be concluded that there is a large gap between the production target and the production achievement, especially at the phosphoric acid plant. The gap range is caused by several influencing factors, starting from weather and wind direction factors, leadership factors, management, and work safety climate at the phosphoric acid plant.

This phosphoric acid company, especially in the phosphoric acid plant, has a total of 48 workers. Which is divided into four groups. Each group consists of twelve workers. The composition of workers consists of one supervisor, eight operators, two foremen, and one superintendent. According to the results of an in-depth interview conducted on one of the Safety, Health, and Environment (SHE) staff in this company, workers at the phosphoric acid plant have not maximally implemented a good work safety climate, starting from the application of housekeeping, the application of behavior-based safety, and the compliance with the use of personal protective equipment. In addition, the number of SHE personnel is still minimal, which is only three people. Therefore, the aspect of responsibility for occupational health and safety is still returned to each individual worker or to each head of each plant.

However, the SHE unit continues to carry out several occupational safety and health programs such as monitoring in the form of safety patrols and safety observations on a regular basis to identify unsafe acts and safe conditions, initiating safety representatives in each work unit, applying safety work permits, Hazard Identification, Risk Assessment, and Determinant Control (HIRADC) analysis, conducting safety induction, and so on. In addition, the production unit is the unit that has the most dominant exposure to noise and dust hazard if compared to other units. Thus, it is also the reason for the higher risk of accidents and occupational

diseases in the production unit. Based on the background explained, this study aims to analyze the relationship between leadership style and work safety climate at this Phosphoric Acid Industry.

## METHODS

This study used a research design using cross-sectional quantitative descriptive research methods. This study also has passed the ethical assessment with the ethical clearance number as 240/HRECC.FODM/V/2021. This study focuses on finding the value of a variable and then analyses the relationship's strength between one variable and another. The variables are leadership style, which is divided in two dimensions, and the work safety climate variable, which is divided in seven dimensions. The population of this study were 44 workers at the phosphoric acid plant of Phosphoric Acid Industry. The respondents consisted of 32 operators, eight foremen, and four superintendents involved in this study in May 2021. The independent variables in this study were the dimensions of leadership style according to The Ohio State Studies (Leader-Behavior Description Questionnaire) which consisted of considerations (the leader's relationship with its members) and the initiating structure dimension (the role of the leader in achieving its goals). Furthermore, the dependent variable in this study is the state of the work safety climate in each work group in the production unit.

The data used in this study are primary data obtained through a questionnaire distributed to all workers in the phosphoric acid plant in the Phosphoric Acid Industry. The questionnaire was filled out independently by the workers, which aims to determine the leadership style according to the Ohio State Studies using Leader Behavior Description Questionnaire that also determines the leadership style perception of each worker. This tool also determined the considerations and initiating structure dimension level. Each leadership style is calculated by adding up the scores obtained for each leadership style. Each leadership style is categorized into high, medium, and low categories using the standard deviation and mean of each support dimension (Russell, Stogdill and Coons, 2015).

Furthermore, the questions regarding the assessment of work safety climate are analyzed based on Nordic Occupational Safety Climate Questionnaire (NOSACQ-50) developed by The National Research Center for the Working

Environment (Kines *et al.*, 2011). Each dimension of work safety climate is calculated by adding up the scores obtained in each dimension. This is done to determine the level of work safety climate in each dimension (Kines *et al.*, 2011). Finally, an analysis of the relationship between each leadership dimension and the dimensions of work safety climate was carried out. Furthermore, the sequence of data analysis was carried out with a normality test which was then tested using the Spearman test.

## RESULT

The descriptive statistical analysis was used to describe the leadership styles and the work safety climate at the phosphoric acid plant at the Phosphoric Acid Industry. The description will be explained in tables below. The tables describe the frequency of each leadership style and each safety climate dimension.

### The Distribution of Leadership Style

The characteristics of the leadership style will be described in this sub-section. The leadership styles are described including the considerations and initiating structure. They are shown in Table 1.

Based on Table 1, it shows that the leadership style from the considerations dimension (leadership relationship with its members) mostly shows a very high relationship; this can be seen from the percentage of 47.7%, while the remaining 25% feel it is sufficient and 27.3% feel high. The leadership style from the initiating structure dimension (the role of the leader in achieving its goals) was already high, indicated by a percentage of 47.7%, while a small portion felt enough with a percentage of 18.2% and felt very high with a percentage of 34.1%.

**Table 1.** The Distribution of Leadership Styles Dimension at Phosphoric Acid Plant on May 2021

Variable	Frequency	Percentage
<b>Considerations</b>		
Fair	11	25.0%
High	12	27.3%
Very High	21	47.7%
<b>Initiating Structure</b>		
Fair	8	18.2%
High	21	47.7%
Very High	15	34.1%

### The Distribution of Work Safety Climate

The characteristics of work safety climate include the management safety priority and ability; worker safety commitment; peer safety communication, learning, and innovation; management safety justice; workers' trust in the efficacy of safety systems; workers' safety priority and risk non-acceptance; and work safety empowerment are shown in Table 2.

**Table 2.** Distribution of Work Safety Climate Dimensions in Phosphoric Acid Plant on May 2021

Variable	Frequency	Percentage
<b>Management Safety Priority and Ability</b>		
Low	3	6.8%
Fairly Low	1	2.3%
Fairly Good	15	34.1%
Good	25	56.8%
<b>Worker Safety Commitment</b>		
Low	1	2.3%
Fairly Low	9	20.5%
Fairly Good	19	43.2%
Good	15	34.0%
<b>Peer Safety Communication, Learning, and Innovation</b>		
Low	6	13.6%
Fairly Low	2	4.6%
Fairly Good	18	40.9%
Good	18	40.9%
<b>Management Safety Justice</b>		
Low	1	2.3%
Fairly Low	7	15.9%
Fairly Good	16	36.5%
Good	20	45.5%
<b>Workers' Trust in The Efficacy of Safety Systems</b>		
Low	1	2.3%
Fairly Low	6	13.6%
Fairly Good	15	34.1%
Good	22	50.0%
<b>Workers' Safety Priority and Risk Non- Acceptance</b>		
Low	8	18.2%
Fairly Low	16	36.4%
Fairly Good	18	40.9%
Good	2	4.5%
<b>Workers' Safety Empowerment</b>		
Low	2	4.5%
Fairly Low	7	15.9%
Fairly Good	16	36.4%
Good	19	43.2%

Table 2 shows that the work management safety priority and ability are good with a percentage of 56.8% and some are quite bad with a percentage of 2.3%. Work safety climate, especially on the dimensions of worker safety commitment, shows that most of them are quite good with a percentage of 43.2% and some are still bad with a percentage of 2.3%. The work safety climate on the dimensions of peer safety communication, learning, and innovation shows that most of them are quite good and good with a percentage of 40.9% and a small part is quite bad with a percentage of 4.5%.

Then, the safety justice dimension shows that most of them are good with a percentage of 45.5% and a small part is still bad with a percentage of 2.3%. The dimension of workers' trust in the efficacy of safety systems shows that most of them are good with a percentage of 50% and some are quite bad with a percentage of 2.3%. The work safety climate on the dimension of workers' safety priority and risk non- acceptance shows that most of them are good with a percentage of 40.9% and a small part is still bad with a percentage of 4.5%. Then, the dimensions of work safety empowerment show that most of

**Table 3.** The Relationship between Leadership Style and Safety Climate in Phosphoric Acid Plant in May 2021

Variable	Correlation Coefficient	P value
	Leadership Style	
Work Safety Climate	0.787	0.000

**Table 4.** The Relationship between Considerations and Safety Climate Dimensions in Phosphoric Acid Plant in May 2021

Variable	Correlation Coefficient	P value
	Considerations	
Management Safety Priority and Ability	0.622	0.000
Worker Safety Commitment	0.290	0.057
Peer Safety Communication, Learning, and Innovation	0.420	0.005
Management Safety Justice	0.384	0.010
Workers' Trust in The Efficacy of Safety Systems	0.592	0.000
Workers' Safety Priority and Risk Non- Acceptance	0.317	0.036
Workers' Safety Empowerment	0.519	0.000

them are good with a percentage of 43.2% and a small part is still bad with a percentage of 4.5%.

### The Relationship between Leadership Style and Work Safety Climate

Correlation analysis is between each independent variable, called leadership style, which consists of considerations dimension and initiating structure, with the dependent variable, namely the work safety climate including management safety priorities and abilities; worker safety commitment; peer safety communication, learning, and innovation, safety justice, workers' trust in the efficacy of safety systems; workers' safety priority and risk non – acceptance; and work safety empowerment performed using the Spearman Rank correlation test with a 95% confidence interval. There is the relationship between leadership style and safety climate.

Through the table in the previous section, it can be seen that the correlation coefficient value of work safety climate with leadership style is 0.787. Therefore, it can be concluded that there is a very strong positive correlation between leadership style and work safety climate.

### The Relationship between Considerations and Work Safety Climate

This time, it will be explained the level of relationship between consideration and work safety climate. The level of relationship is analyzed using

**Table 5.** The Relationship between Initiating Structure and Work Safety Climate Dimensions in Phosphoric Acid Plant in May 2021

Variable	Correlation Coefficient	P value
	Initiating Structure	
Management Safety Priority and Ability	0.395	0.008
Worker Safety Commitment	0.456	0.002
Peer Safety Communication, Learning, and Innovation	0.299	0.049
Management Safety Justice	0.259	0.090
Workers' Trust in The Efficacy of Safety Systems	0.162	0.294
Workers' Safety Priority and Risk Non-Acceptance	0.388	0.009
Workers' Safety Empowerment	0.440	0.003

the Spearman Rank correlation method. They are shown in Table 4.

Table 4 shows that the relationship between consideration and priority and safety management ability has a correlation coefficient value of 0.622, which means it has a high positive correlation because the value is close to 1 with a Pvalue (0.000). Then, the relationship between consideration and worker safety commitment has a correlation coefficient value of 0.290, which means it has a weak positive correlation because the value is close to 0 with a Pvalue (0.057). The relationship between consideration and peer safety communication, learning, and innovation has a correlation coefficient value of 0.420, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.005).

Furthermore, the relationship between consideration and work safety justice has a correlation coefficient value of 0.384, which means it has a very moderate positive correlation because the value is close to 0.5 with a Pvalue (0.010). The relationship between consideration and workers' trust in the efficacy of safety systems has a correlation coefficient value of 0.59,2 which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.000). Due to the Pvalue < 0.05, it can be concluded that there is a positive correlation between consideration and work safety justice.

In addition, the relationship between consideration and workers' safety priority and risk non- acceptance has a correlation coefficient value of 0.317, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.036). The relationship between consideration and work safety empowerment has a correlation coefficient value of 0.519, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.000).

### **The Relationship between Initiating Structure and Work Safety Climate**

This section will discuss the level of relationship between initiating structure and work safety climate using Spearman Rank correlation analysis that is shown in Table 5.

Table 5 shows that the relationship between initiating structure with management safety priority and ability has a correlation coefficient value of 0.395, which means it has a moderate positive correlation because the value is close to 0.5 with a

Pvalue (0.008). The relationship between initiating structure and worker safety commitment has a correlation coefficient value of 0.456, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.002). The relationship between initiating structure with peer safety communication, learning, and innovation has a correlation coefficient value of 0.299, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.049).

Over and above, the relationship between initiating structure and work safety justice has a correlation coefficient value of 0.259, which means it has a weak positive correlation because the value is close to 0 with a Pvalue (0.090). The relationship between initiating structure and workers' trust in the efficacy of safety systems has a correlation coefficient value of 0.162, which means it has a weak positive correlation because the value is close to 0 with a Pvalue (0.294). The relationship between initiating structure and workers' safety priority and risk non-acceptance has a correlation coefficient value of 0.388, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.009). The relationship between initiating structure and work safety empowerment has a correlation coefficient value of 0.440, which means it has a moderate positive correlation because the value is close to 0.5 with a Pvalue (0.003).

## **DISCUSSION**

### **The Distribution of Leadership Style**

The leadership style, especially the considerations dimension (the leader's relationship with their members) is mostly in the very high category. This means that the leader is mostly using their interpersonal skill to communicate the safety aspects among their members. Moreover, leadership style, especially the initiating structure dimension (the role of the leader in achieving its goals), is mostly in the high category. This means that the leaders also have task orientation during the work process, so they will give the clear vision and mission about safety aspects to the members (Russell, Stogdill and Coons, 2015). The higher level of leadership style will perform effective work between workers (Henkel and Bourdeau, 2018), Finally, this high level of leadership style in every dimension indicates that the leaders will help the members to reach organizational goals, ensure

the members' prosperity during their work, and accept also executing the advice from the members (Prihantoro, 2016).

### **The Distribution of Work Safety Climate**

Regarding the data obtained through this study, there are several dimensions of work safety climate that have varying categories. The dimensions of work safety climate that most have a good category are in the dimensions of management safety priority and ability; dimensions of peer safety communication, learning, and innovation; dimensions of management safety justice; dimensions of workers' trust in the efficacy of safety systems; dimensions of workers' safety priority and risk non-acceptance; and workers' safety empowerment dimensions. This indicates that the work safety climate in this company has reached its good state even though there are still many dimensions needed to be improved.

The results of this study indicate that the good level of safety climate dimensions will demonstrate the good practice, attitude, and behavior related to occupational safety (Fagnoli and Lombardi, 2020). Moreover, the good safety climate in the company also helps to inform the potential risk and hazard during the process (Susanto, Prastawa and Oktaningrum, 2019). Finally, the good dimension of safety climate indicates that there is an integration between safety climate and daily operation of an organization in formalized way (Accou and Reniers, 2020). This is not surprising because the implementation of safety climate in Phosphoric Acid Plant is good in most aspects although there still some aspects of safety climate need to be improved.

### **The Relationship between Leadership Style and Work Safety Climate**

The research data are collected using the Leader Behavior Description Questionnaire (LBDQ) and NOSACQ-50 (Nordic Occupational Safety Climate Questionnaire) have shown that there is a strong positive correlation between leadership style and work safety climate. This is in line with the theories that form the basis of this research theory. The theory shows that there is a correlation between leadership style and work safety climate. The strong positive correlation shown by the relationship between leadership style and occupational safety climate dimensions is in line with the other theories, where occupational safety climate can be developed

using leadership style performed by the leaders on each work group (Zohar, 2010).

In addition, the results of this study are also in line with the theory where organizational factors, which include leadership style, can affect the work safety climate along with the organizational climate found in the workplace (Becher, 2016). The higher leadership level executed by the leaders will perform a higher level of overall safety climate.

The strong safety leadership will produce a stronger impact on organizational culture, which then subsequently impacts on values, attitudes, and behaviors of individuals in organizations attempting to manage safety in the workplace. Those values, attitudes, and behaviors will conduct and improve every safety climate dimension in the workplace (Skeepers and Mbohwa, 2015). The previous research findings also express that this study is in line with most of the theories and studies. This study indicates that most workers have a very high level of considerations level and high level of initiating structure level. In contrast, the work safety climate dimensions reach their higher level as well.

Moreover, the safety climate concept is closely aligned with organizational culture, especially in the leadership aspect. The strong connection between leadership style and managerial skill that are performed by the leaders is through the strong common dependencies in work processes and leadership factors. The leadership factors that are included in organizational factors are important factors that contribute to safety reliability attributes and prevention of failure in high-risk industries (Caldwell, 2018).

Another theory also supported this research result. The safety leadership will enhance employees to recognize the near miss also the unaccepted risk that will occur during the operation process. Previous study findings also suggest that safety specific leadership will support the employees to do positive work behavior especially on developing the safety climate because the leader will perform the goal orientation to all employees (Lu *et al.*, 2019).

Additionally, this research is also supported by the theory which declared that safety management system that is executed by leaders in every working group in the company will continuously improve the safety of operations. Moreover, the safety leadership also has its role as the vehicle for reactive safety management and will produce a good safety climate in the working group. Leadership in the sub-unit identified with general principles that conclude

the good practices of safety including having safety vision, give safety its important place in the organization, share the safety vision, is credible and also reliable with the safety vision, promote the team spirit toward safety, available on-site to observe the process of safety, and acknowledge the good safety practice (Accou and Reniers, 2020).

### **The Relationship between Considerations and Work Safety Climate**

Based on the correlation analysis that has been done, there is a strong positive relationship between consideration and management's safety priorities and capabilities. Furthermore, there is also a moderate positive correlation between the leadership style considerations and the dimensions of the work safety climate, especially in the dimensions of peer safety communication, learning, and innovation; work safety justice; workers' trust in the efficacy of safety systems; priority of worker safety and unacceptable risks; and empowerment of work safety.

There is a strong and moderate positive correlation shown by the relationship between the leadership style of considerations with the dimensions of the work safety climate, especially on the dimensions of management safety priority and ability; peer safety communication, learning, and innovation; work safety justice; workers' trust in the efficacy of safety systems; priority of worker safety and unacceptable risks; and empowerment of work safety is supported by the Safety, Health, and Environment section's program. The program was the implementation of safety representative activities in 2019, where safety representatives, who are leaders of each unit, had a training related to occupational health and safety.

The occupational health and safety training consists of emergency response training, occupational health and safety communication, accident investigation, behavior-based safety, housekeeping, clean and healthy behavior, and fire prevention and control.

Based on the work program in the form of a safety representative, especially those having a high-consideration leadership style, can transmit the safety information to their members. In addition, this safety representative program also gives confidence in the ability of workers, justice of work safety, and provides innovation related to improving the work safety climate, especially in the Phosphoric Acid Plant.

The strong and moderate positive correlation shown by the relationship between considerations and the dimensions of the work safety climate was in line with the theory which stated that policies regarding work safety performed by the leader with strong leadership style can be related to organizational climate. Thus, they can achieve good safety behavior and produce positive results (Khasanah and Kholil, 2019). Furthermore, it was found that a leader with a great preventive safety voice will improve the safety procedure in the company (Bazzoli *et al.*, 2020)

Furthermore, the relationship between considerations and safety climate, especially in management safety priority and ability, is supported by previous research which found that the leader who has a good communication ability with team members will perform a good safety climate in their unit section. This means that they must be able to convey information related to occupational health and safety effectively to other people in the workplace, especially their subordinates. In its application, it can be seen from safety meetings or safety briefings in the workplace. The researcher also made field observations in this case, it was known that there was no information related to occupational health and safety posted on the bulletin board (Prihatiningsih, 2020). This also shown in this research study, in the Phosphoric Acid Industry, that the leader has communicated the safety climate aspect and through the safety representative training. This also shows how management put good attention and priority into occupational health and safety to reach a better safety climate.

Moreover, this investigation is additionally in accordance with another past research, which expressed that the directors' obligation to work-related safety and health is normally viewed as one of the vital components of successful occupational management, safety climate and culture (Tappura, 2020). The Phosphoric Acid Company, especially the management, has implemented good safety procedure such as accident investigation, firefighting, accident report, and many other procedures related to safety and health. Not only producing the procedure, but also communicating with the members. This is also shown that the leaders who have considerations skill, especially by sharing the procedure to the members, will perform the good management safety priority and ability of the safety climate dimension.

In more detail, the perception of considerations leadership style have a strong and moderate relationship with the work safety climate, especially on the dimensions of management safety priority and ability; peer safety communication, learning, and innovation; work safety justice; workers' trust in the efficacy of safety systems; priority of worker safety and unacceptable risks; and empowerment of work safety is consistent with previous research, which stated that people who work for a company with more positive safety leadership and climate perceive a lower accident risk than those with both lower safety leadership and climate (Oah, Na and Moon, 2018).

Moreover, the dominant leadership style of the leader's relationship with its members, especially in conducting safety training, doing research and communicating the safety aspects to the members, has a significant relationship with the work safety climate. The reason was that a leadership style that emphasizes interpersonal relationships between leaders and members will affect the flow of work safety information and activities carried out inside and outside the organization. So, based on the results of the study, good communication and relationships between leaders and their members have a strong relationship with the work safety climate. Therefore, this fact is reciprocal with the considerations, where the leader upholds his relationship with members in carrying out work and brings the organization to its goal of creating a good work safety climate (Winn, 2016).

In addition, based on another study, it was expressed that the training preparation program, which was predominantly based on members' connection with the leader, might be a financially savvy approach to establish a positive safety climate. For instance, interventions designed which can be executed to create or improve a safety climate would be more effective if workers treat first-line supervisors as models, mentors and considerate friends, and feel free to raise safety issues (Shen *et al.*, 2017). Thus, it can also be concluded that the results of the research conducted by Shen *et al.* (2017) are in accordance with the results of this study where the considerations, which are based on the relationship between the leader and their members, including the image of the leader in dealing with the work safety climate, have a strong and moderate positive relationship with the work safety climate, especially, the dimensions of management safety priority and ability; peer safety

communication, learning, and innovation; work safety justice; workers' trust in the efficacy of safety systems; priority of worker safety and unacceptable risks; and empowerment of work safety.

Furthermore, there are also other studies that support a moderate relationship between the leadership style considerations and the work safety climate, especially on the dimensions of workers' trust in the efficacy of safety systems and the priority of worker safety and unacceptable risks. Research suggested that there is a relationship between leadership style and workers' trust in the efficacy of safety systems as well as workers' safety priority and risk non-acceptance. The leadership style will shape the way supervisors communicate to the members, especially about the related safety goals, and the embedded industry practices will have the role of training among the members. At a further level, the way leaders share the thoughts and information about safety climate will form the essence of the organizational safety climate and create the most basic mechanism for safety system control (Casey *et al.*, 2017).

Another related research shows that the project leader's safety commitment, safety institutions, risk response, and employee's safety attitude have a significant impact on the safety climate. The authority's effect has been examined and demonstrated as a huge factor in security in the board by numerous researchers in various fields, for example, development projects. Task pioneers' prizes and disciplines with respect to wellbeing practices will energize security creation by the bleeding edge staff and upgrade the security environment level of the undertaking. In the interim, the significance appended by the supervisor to wellbeing foundations fundamentally affects the security environment of the undertaking. Furthermore, the consideration of wellbeing organizations is helpful for guaranteeing the security oversight of undertaking wellbeing chiefs in order to improve the wellbeing environment in the activity (Wu *et al.*, 2019).

However, there is also a weak positive correlation shown in the relationship between the considerations and the dimensions of work safety commitment. This weak positive correlation certainly has results that are contrary to some previous studies and theories. One of the most dominant is the result of this study which is in contrast to that conducted by Orlandi and Brooks (2018) which discussed leadership style with work safety climate and stated that the leadership style



has a close relationship with safety awareness and commitment. The outcome from the previous study found a positive correlation to the research question and hypothesis with the safety climate results indicating a positive improvement for the intervention group associated with the leadership influence, as a direct consequence of the intervention training.

The discrepancy between the results of this study and the study conducted by Orlandi and Brooks (2018) could be caused by different and dynamic research subjects, where, in this study, the research subjects studied were workers in the production unit, especially in the Phosphoric Acid industry, while the previous research conducted by Orlandi and Brooks (2018) was implemented on workers in an office.

In addition, the difference in research time, which is four years apart, namely between 2017 and 2021, can also be an indication of the occurrence of contradictory results between this study and previous research.

### **The Relationship between Initiating Structure and Work Safety Climate**

Based on the correlation analysis that has been carried out, it shows that there is a moderate relationship between the initiating structure leadership dimension and management safety priority and ability; worker safety commitment; peer safety communication, learning, and innovation; worker safety priority and unacceptable risks; and empowerment of work safety. The moderate positive correlation between the initiating structure leadership style and the safety climate dimension indicates that the higher the perception of the initiating structure leadership style, the better the safety climate dimension, especially in the management safety priority and ability; worker safety commitment; peer safety communication, learning, and innovation; worker safety priority and unacceptable risks; and work safety empowerment.

The results of this research can be caused by the existence of work programs and occupational health and safety procedures implemented in the production unit, especially at the Phosphoric Acid Plant. The implementation of work procedures, the participation of the unit leaders in the Hazard Identification, Risk Assessment, and Determining Control (HIRADC) analysis, the participation of the unit leaders in the Job Safety Assessment (JSA) analysis, as well as the implementation of emergency

response procedures and accident investigation are real examples of the implementation of the initiating structure leadership style.

The application of these programs and work procedures can be a real example of the implementation of the initiating structure leadership style carried out by each leader at the Phosphoric Acid Plant. Thus, the implementation of occupational health and safety programs and work procedures in the workplace can encourage leaders to have a clear vision and mission, then communicate the roles and activities that must be carried out by members in achieving a good work safety climate as well. In principle, this can result in a good work safety climate, especially regarding the management safety priority and ability; commitment to worker safety; peer safety communication, learning, and innovation; priority of worker safety and unacceptable risks; and empowerment of work safety.

There is moderate positive correlation on initiating structure with management safety priority and ability; commitment to worker safety; peer safety communication, learning, and innovation; priority of worker safety and unacceptable risks; and work safety empowerment is related according to a study conducted by Daniel (2017). The research stated that the dominant leadership style of leaders in organizational formation through the formulation of the leader's vision and mission has a close relationship to the work safety climate. The reason is that a leader who has a clear vision and mission, will minimize the occurrence of bad safety behavior and climate in every dimension. In principle, the work safety climate is a dynamic aspect that will continue to change, so that a leadership style with a clear and dominant vision in controlling tasks and all activities that occur in the workplace can be one of the supporters of the creation of a good work safety climate as well (Daniel, 2017).

Based on the previous study, it can be seen that it is in harmony with the results of this study. The perception of the initiating structure, where a leader with this leadership style is a leader who can clearly define job goals, employee roles and things that need to be addressed, carried out and considered by members in achieving organizational goals has a moderate positive relationship with the work safety climate, especially in the dimensions of management safety priority and ability; commitment to worker safety; peer safety communication, learning, and innovation; priority of worker safety and unacceptable risks; and empowerment of work

safety. This also means that the higher the initiating structure leadership style the leader has, the better the work safety climate in the workplace.

Another supporting research conducted by Caroline, Harianto and H (2019) showed that there is also a significant relationship between leadership style and overall safety climate. The dominant leadership style will propose a better safety climate in the workplace. This is also related with another research that work safety behavior is strongly influenced by the safety leadership possessed by the leader and the safety climate in the company environment (Syahrial, 2017).

In addition, there are other studies that are in line with the results of this study. Based on this research, it was found that the initiating structure leadership style has a close relationship with the work safety climate because the safety climate performance is specifically a form of task proficiency. This indicates that the leadership which is better task-oriented will affect the safety climate in the company (Walumbwa *et al.*, 2019).

The results of this study are in line with the previous research because they indicate that there is a moderate and positive relationship between the initiating structure leadership style and the dimensions of priority work safety and management safety capabilities; commitment to worker safety; peer safety communication, learning, and innovation; priority of worker safety and unacceptable risks; and empowerment of work safety.

Meanwhile, the relationship between the initiating structure leadership dimension with work safety justice and workers' trust in the efficacy of safety systems has a weak positive correlation. There is one study that is in line with and supports the results of this study. In a study conducted by Hoffmeister *et al.* (2014), it was explained that all aspects of leadership style can be related to the entire work safety climate except the work safety climate in the aspect of work safety participation as well as worker trust and volunteerism in implementing a work safety climate. This can be interpreted that the leadership style has no or a weak relationship with the work safety climate, especially in the aspects of work safety participation and organizational trust, and the volunteerism of workers in implementing the work safety climate. The results of Hoffmeister *et al.* (2014) are in line with the weak relationship between the initiating structure leadership style and the dimensions of work safety climate, especially

in the dimension of workers' trust in the efficacy of safety systems.

## CONCLUSION

There is a strong positive relationship between consideration and management's safety priorities and abilities. Furthermore, there is also a moderate positive correlation between the leadership style considerations and the dimensions of work safety climate, especially in the dimensions of peer safety communication, learning, and innovation; work safety justice; workers' trust in the efficacy of safety systems; priority of worker safety and unacceptable risks; and empowerment of work safety. Furthermore, there is a moderate relationship between the initiating structure leadership dimension and management's safety priorities and capabilities; commitment to worker safety; peer safety communication, learning, and innovation; workers' safety priority and risk non-acceptance; and empowerment of work safety.

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## REFERENCES

- Accou, B. and Reniers, G. (2020) 'Introducing the Extended Safety Fractal: Reusing the Concept of Safety Management Systems to Organize Resilient Organizations', *International Journal of Environmental Research and Public Health*, 17(15), pp. 1–19.
- Bazzoli, A. *et al.* (2020) 'Speaking up about Workplace Safety: An Experimental Study on Safety Leadership', *Sustainability (Switzerland)*, 12(18), pp. 1–22.
- Becher, H. (2016) *Psychosocial Safety Climate and better Productivity in Australian Workplaces: Costs, Productivity, Presenteeism, Absenteeism*. Australia: Safe Work.

- Caldwell, C. L. (2018) *Safety Culture and High-Risk Environments A Leadership Perspective*. Boca Raton: CRC Press.
- Caroline, J., Harianto, F. and H, R. P. (2019) 'Pengaruh Gaya Kepemimpinan Terhadap Budaya K3 yang Dimoderasi Tingkat Pendidikan dan Pengalaman Kerja pada Proyek Konstruksi di Surabaya', *Jurnal Rekayasa Teknik Sipil Universitas Madura*, 4(2), pp. 1–6.
- Casey, T. *et al.* (2017) 'Safety Climate and Culture: Integrating Psychological and Systems Perspectives', *Journal of Occupational Health Psychology*, 22(3), pp. 341–353.
- Daniel, L. (2017) *Practical Guide to Safety Leadership: An Evidence-Based Approach*. London: Routledge.
- Fargnoli, M. and Lombardi, M. (2020) 'NOSACQ-50 for Safety Climate Assessment in Agricultural Activities: A Case Study in Central Italy', *International Journal of Environmental Research and Public Health*, 17(24), pp. 1–20.
- Henkel, T. and Bourdeau, D. (2018) 'A Field Study: An Examination Of Managers' Situational Leadership Styles', *Journal of Diversity Management (JDM)*, 13(2), pp. 7–14.
- Hoffmeister, K. *et al.* (2014) 'The Differential Effects of Transformational Leadership Facets on Employee Safety', *Safety Science*, 62, pp. 68–78.
- International Labour Organization (ILO) (2019) Annual Report Annual Report 2017 Social Finance and Impact Insurance.
- International Labour Organization (ILO) (2020) 'Resolution on the ILO Centenary Declaration for the Future of Work, 2019'.
- Jafari, M. J. *et al.* (2017) 'Development and Validation of a New Safety Climate Scale for Petrochemical Industries', *Work*, 58(3), pp. 309–317.
- Khasanah, N. and Kholil (2019) 'Analysis the Effect of Leadership to Safety Climate, Safety Culture and Safety Performance', *Asian Journal of Advanced Research and Reports*, 2(June), pp. 1–12.
- Kines, P. *et al.* (2011) 'Nordic Safety Climate Questionnaire (NOSACQ-50): A new tool for Diagnosing Occupational Safety Climate', *International Journal of Industrial Ergonomics*, 41(6), pp. 634–646..
- Lu, H. *et al.* (2019) 'Safety-Specific Leadership, Goal Orientation, and Near-Miss Recognition: The Cross-Level Moderating Effects of Safety Climate', *Frontiers in Psychology*, 10(May), pp. 1–9.
- Oah, S., Na, R. and Moon, K. (2018) 'The Influence of Safety Climate, Safety Leadership, Workload, and Accident Experiences on Risk Perception: A Study of Korean Manufacturing Workers', *Safety and Health at Work*, 9(4), pp. 427–433.
- Orlandi, L. and Brooks, B. (2018) 'Measuring Mental Workload and Physiological Reactions in Marine Pilots: Building Bridges towards Redlines of Performance', *Applied Ergonomics*, 69(May), pp. 74–92.
- Prihantoro, D. E. (2016) 'Mengenal gaya Kepemimpinan dalam Dunia Pendidikan', *Tarbawiyah*, 13,(2), pp. 293–314.
- Prihatiningsih, S. (2020) 'Safety Leadership Characteristic of Supervisor Production Division at PT. BCD', *Journal of Vocational Health Studies*, 3(3), p. 103.
- Russell, J. W., Stogdill, M. and Coons, A. E. (2015) 'Leader Behavior: Its Description and Measurement, by Ralph', pp. 460–463.
- Shen, Y. *et al.* (2017) 'The Impact of Transformational Leadership on Safety Climate and Individual Safety Behavior on Construction Sites', *International Journal of Environmental Research and Public Health*, 14(1), pp. 1–17.
- Skeepers, N. C. and Mbohwa, C. (2015) 'A Study on the Leadership Behaviour, Safety Leadership and Safety Performance in the Construction Industry in South Africa', *Procedia Manufacturing*, 4, pp. 10–16.
- Susanto, N., Prastawa, H. and Oktaningrum, D. D. (2019) 'Safety Climate Assessment of Furniture Industry: A Case Study', *IOP Conference Series: Materials Science and Engineering*, 598.
- Syahrial, Y. (2017) 'Pengaruh Safety Leadership Dan Safety Climate Pada Safety Behaviour', *Manajemen Universitas Sebelas Maret Surakarta*, 7(2), pp. 106–131.
- Tappura, S. (2020) 'The Management of Occupational Health and Safety Managers' Perceptions of the Challenges , Necessary Support and Organisational Measures to support Managers'. Thesis. Tampere: Faculty of Business and

Built Environment Tampere University of Technology

- Walumbwa, F. O. *et al.* (2019) 'Employee Service Performance and Collective Turnover: Examining the Influence of Initiating Structure Leadership, Service Climate and Meaningfulness', *Human Relations*, 72(7), pp. 1131–1153.
- Winn, G. L. (2016) *Practical Leadership Skills*. Boca Raton: CRC Press.
- Wu, X. *et al.* (2019) 'Development of a Safety Climate Scale for Geological Prospecting Projects in China', *International Journal of Environmental Research and Public Health*, 16(6), pp. 1-13.
- Zhu, J. *et al.* (2018) 'Shared Leadership: A State-of-the-Art Review and Future Research Agenda', *Journal of Organizational Behavior*, 39(7), pp. 834–852.
- Zohar, D. (2010) 'Thirty Years of Safety Climate Research: Reflections and Future Directions', *Accident Analysis and Prevention*, 42(5), pp. 1517–1522.