



Dominant Factors Level of Safety Culture Maturity Model With Work Accidents at PT Barata Indonesia

Luthfiyah Purnama Juwita^{1*}, Nugrahadi Dwi Pasca Budiono²

¹ Faculty of Public Health, Muhammadiyah University of Gresik, luthfiyahpurnama21.aja@gmail.com

² Faculty of Public Health, Muhammadiyah University of Gresik, nugrahadi@umg.ac.id

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ABSTRACT

Background: Many work accidents are caused by worker carelessness and work environment is an indicator of work safety culture maturity model.

Objective: To analyze the dominant factors that effect the level of safety culture maturity model at PT Barata Indonesia.

Method: The research design is a cross sectional survey with an observational approach. The population is all workers in 2023 as many 625 people. Total sample of 244 respondents was taken using simple random sampling. Independent variables: commitment, leadership, responsibility, competence, involvement, information and communication, risk, and organizational learning, while the dependent variable is work accidents. Instruments used were a questionnaire sheet regarding the safety culture maturity model and work accident history form. Statistic test using Chi-Square test and Logistic Regression.

Results: The overall level of safety culture maturity model is at a proactive level with the majority of work accidents never occurring (58.6%). Chi-Square test and Logistic Regression test result a value of $p = 0.000 < 0.05$, with the risk variable having the highest Exp(B) value (3.187) compared to other variables.

Conclusion: There is an effect on the level of safety culture maturity model on work accidents, and risk is the most dominant factors. Discussions about safety can strengthen practices that minimize the occurrence of work accidents, as well as ensuring cultural safety in operations and work.

Corresponding Author:

Luthfiyah Purnama Juwita
Faculty of Public Health, Muhammadiyah University of Gresik
Email: luthfiyahpurnama21.aja@gmail.com

INTRODUCTION

ILO (International Labor Organization) reports that every 15 seconds there are around 160 cases of work accidents in the world (1). Work accident cases in developing countries (such as: Indonesia, China, India) are four times higher than in industrialized countries such as Germany, the United States, France (2).

BPJS Employment in the 2021 Integrated Report recorded that the number of work accident cases in Indonesia continued to increase from 182,835 cases in 2019 to 221,740 cases in 2020, in 2021 it was 234,370 cases (3), and 265,334 work accident cases since January to November 2022 (4).

Work accidents mean that there is an incident at a person's place of work, for example from home to work or from work to home, even illnesses caused in the area around work (5). Work accidents are events that often occur in the workplace, and according to the Multiple Causation Theory introduced by Petersen, the causes of work accidents are divided into two, namely unsafe acts are the actions of a worker who deviates from the rules, and unsafe conditions, namely an unsafe work environment that can cause work accidents directly (6). The maturity of a safety culture consists of ten elements, namely management

commitment and outreach, communication, production versus safety, organizational learning, safety resources, participation, shared perception of safety, trust, industrial relations and job satisfaction, and training, then the maturity level Occupational Health and Safety culture is divided into five levels, namely vulnerable, reactive, compliant, proactive and resilient, this model can help organizations identify the organization's weaknesses and strengths in implementing work safety programs (7).

Researching the maturity of safety culture in the workplace at a factory that has the highest accident incidence in Brazil, shows that work environment factors, Occupational Health and Safety regulations and procedures, information, communication and commitment are at the highest level of maturity of work safety culture (8).

PT Barata Indonesia is a state-owned company which operates in the manufacturing and fabrication sector, which in every production process is not free from potential dangers (in the form of exposure to hot flames of 1600oC, welding sparks, grenda, etc.). The results of the researcher's preliminary study on Tuesday, November 14 2023 through interviews with the Occupational Health and Safety section at PT Barata Indonesia stated that, cases of work accidents (such as: pinched, squeezed, hit, crushed, burns, bruised hips and legs, eye irritation, burns, falls from elevations) in 2022 there were 3,4% cases recorded, and from January to September 2023 there were 3,7% cases, these work accidents were caused by worker negligence and the work environment. The maturity level of work safety culture at PT Barata Indonesia which has been running throughout 2022 is at the vulnerable-reactive level, which means it is at the stage of accepting that an incident occurred towards preventing similar incidents from occurring.

Based on the phenomenon, the results of the researcher's initial observations, as well as a number of previous studies, it is necessary to conduct research with the title "Dominant Factors Level of Safety Culture Maturity Model with Work Accidents at PT Barata Indonesia.

METHODOLOGY

The type of research is quantitative research, cross sectional analytical observational research. The population in this research is all workers of PT Barata Indonesia in 2023, totaling 625 people and the required sample is 244 people, calculated using the formula. The sampling technique for this research uses simple random sampling by paying attention to the inclusion criteria, namely 1. Workers who have worked at PT Barata Indonesia ≥ 1 year. 2. Workers who have signed the respondent's consent form. and the exclusion criteria are 1. Workers who suddenly resigned during the research. 2. Workers who are absent due to sick leave or leave.

The instrument used in this research is a questionnaire sheet regarding the level of maturity of work safety culture which consists of commitment, leadership, responsibility, competence, attachment and involvement, information and communication, risk, and organizational learning, and a work accident history form regarding work accidents in PT Barata Indonesia. Data analysis used the chi square statistical test and multiple logistic regression test with a confidence level of 95% on the SPSS computer program. This research has received an Ethical Approval from the Research Ethics Committee of the Faculty of Health, Muhammadiyah University of Gresik with Number: 012/KET/II.3.UMG/KEP/A/2024.

RESULTS

Univariate Analysis

Tabel 1. Frequency Distribution of Worker Characteristics

Characteristics	f	%
Age		
15-24 years old	20	8,2
25-34 years old	220	90,2
> 54 years old	4	1,6
Gender		
Man	185	75,8
Woman	59	24,2
Education		
Elementary School	0	0,0
Junior High School	0	0,0
Senior High School	94	38,5

Diploma	27	11,1
Bachelor	120	49,2
Magister	3	1,2
Length of Service		
< 1 years old	0	0,0
1-5 years old	125	51,2
6-10 years old	103	42,2
> 10 years old	16	6,6

Based on table 1, it is known that of the 244 PT Barata Indonesia workers in 2024, almost all are of prime/productive age (25-54 years), namely 90.2%. Most of the workers are male at 75.8%. 49.2% of workers have a bachelor's degree and the majority with a work period of between 1 to 5 years, namely 51.2%.

Tabel 2. Frequency Distribution of Workers Based on Research Variables

Variabels	f	%
Commitment		
Vulnerable	0	0,0
Reactive	22	9,0
Compliant	74	30,3
Proactive	137	56,1
Resilient	11	4,5
Leadership		
Vulnerable	0	0,0
Reactive	24	9,8
Compliant	84	34,4
Proactive	117	48,0
Resilient	19	7,8
Responsibility		
Vulnerable	0	0,0
Reactive	27	11,1
Compliant	74	30,3
Proactive	127	52,0
Resilient	16	6,6
Attachment and Involvement		
Vulnerable	1	0,4
Reactive	19	7,8
Compliant	62	25,4
Proactive	134	54,9
Resilient	28	11,5

Risk		
Vulnerable	0	0,0
Reactive	24	9,8
Compliant	69	28,3
Proactive	129	52,9
Resilient	22	9,0
Competence		
Vulnerable	0	0,0
Reactive	23	9,4
Compliant	81	33,2
Proactive	119	48,8
Resilient	21	8,6
Information and Communication		
Vulnerable	1	0,4
Reactive	17	7,0
Compliant	79	32,4
Proactive	129	52,9
Resilient	18	7,4
Organizational Learning		
Vulnerable	1	0,4
Reactive	23	9,4
Compliant	67	27,5
Proactive	129	52,9
Resilient	24	9,8
Work Accident		
Once	101	41,4
Never	143	58,6

Based on table 2, the maturity level of PT Barata Indonesia's work safety culture in 2024 regarding commitment is mostly based on proactive criteria (improving the system), namely 56.1%. Leadership is almost half with proactive criteria (improving the system), namely 48.0%. Responsibility mostly with proactive criteria (improving the system), namely 52.0%. Attachment and involvement mostly with proactive criteria (improving the system), namely 54.9%. The risk is mostly based on proactive criteria (improving the system), namely 52.9%. Competence is almost half with proactive criteria (improving the system), namely 48.8%. Information and communication mostly with proactive criteria (improving the system), namely 52.9%. Organizational learning mostly with proactive criteria (improving the system), namely 52.9%. The majority of workers experienced work accidents in the past year while working at PT Barata Indonesia in 2024, namely 58.6%.

Tabel 3. Overview of Work Accident History

No.	Work Accident History	Once		Never	
		f	%	f	%
1.	Types of Work Accidents				

No.	Work Accident History	Once		Never	
		f	%	f	%
	a. Fallen	21	8,6	223	91,4
	b. Hit by an object	13	5,3	231	94,7
	c. Caught in an object	24	9,8	220	90,2
	d. Exposed to electric current	16	6,6	228	93,4
	e. Radiation	25	10,2	219	89,8
	f. Hit (scratched, cut, punctured)	37	15,2	207	84,8
	g. Other	1	0,4	243	99,6
2.	Nature of Wounds				
	a. Fracture	2	0,8	242	99,2
	b. Sprain	49	20,1	195	79,9
	c. Muscle stretch	51	20,9	193	79,1
	d. Bruises	38	15,6	206	84,4
	e. Amputation	2	0,8	242	99,2
	f. Poisoning	2	0,8	242	99,2
	g. Burns	4	1,6	240	98,4
	h. Skin wounds	17	7,0	227	93,0
	i. Other	0	0,0	244	100
3.	Injured Body Parts				
	a. Head	1	0,4	243	99,6
	b. Neck	4	1,6	240	98,4
	c. Body	8	3,3	236	96,7
	d. Hand	38	15,6	206	84,4
	e. Foot	20	8,2	224	91,8
	f. Eye	13	5,3	231	94,7
	g. Ear	2	0,8	242	99,2
	h. Organs	1	0,4	243	99,6
	i. Other	2	0,8	242	99,2
4.	Cause of Work Accident				
	a. Machine	20	8,2	224	91,8
	b. Electrical equipment	11	4,5	233	95,5
	c. Lifting equipment	20	8,2	224	91,8
	d. Work environment	44	18,0	200	82,0
	e. Radiation	14	5,7	230	94,3
	f. Other	2	0,8	242	99,2

Based on table 3, Obtained a history of work accidents in the last year experienced by workers while working at PT Barata Indonesia in 2024, according to the type of work accident the most frequent were impacts (scratches, cuts, punctures), namely 15.2%, then according to the nature of the injuries the most were muscle strains or tendons, namely 20.9%, with the injured or injured body part being the hand, namely 15.6%, and work accidents caused by the work environment, namely 18.0%.

Bivariate Analysis

Tabel 4. Effect of Commitment on Work Accidents

Commitment	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	0	0,0	0	0,0	0	0,0
Reactive	14	13,9	8	5,6	22	9,0
Compliant	37	36,6	37	25,9	74	30,3
Proactive	50	49,5	87	60,8	137	56,1
Resilient	0	0,0	11	7,7	11	4,5

Total	101	100	143	100	244	100
P-value	0,001					

Based on Table 4, it shows that the commitment of companies with a reactive maturity level (the level of preventing similar incidents) has had the most work accidents, namely 13.9%, compared to those who have never had work accidents, namely 5.6%. The commitment of companies with a compliant maturity level (the level of preventing incidents before they occur accurately) has the most work accidents occurring, namely 36.6%, compared to never having work accidents, namely 25.9%. The commitment of companies with a level of proactive maturity (level of improving the system) has the highest number of never having work accidents, namely 60.8%, compared to having work accidents, namely 49.5%. The company's commitment to a resilient maturity level (the level of the way we run our business) has the highest number of never having work accidents, namely 7.7%, compared to having work accidents, namely 0.0%. P value = 0.001 < 0.05 This means that there is an influence of commitment on work accidents at PT Barata Indonesia.

Tabel 5. Effect of Leadership on Work Accidents

Leadership	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	0	0,0	0	0,0	0	0,0
Reactive	16	15,8	8	5,6	24	9,8
Compliant	45	44,6	39	27,3	84	34,4
Proactive	39	38,6	78	54,5	117	48,0
Resilient	1	1,0	18	12,6	19	7,8
Total	101	100	143	100	244	100
P-value	0,000					

Based on table 5, it shows that leadership with a level of reactive maturity (the level of preventing similar incidents) has had the most work accidents, namely 15.8%, compared to those who have never had work accidents, namely 5.6%. Leadership with a compliant maturity level (the level of accurately preventing incidents before they occur) has the most work accidents, namely 44.6%, compared to those who have never had work accidents, namely 27.3%. Leadership with a level of proactive maturity (level of improving the system) has the highest number of work accidents, namely 54.5%, compared to work accidents, namely 38.6%. Leadership with a resilient maturity level (the level of the way we run the business) has the highest rate of never having a work accident, namely 13.6%, compared to having a work accident, namely 1.0%. P value = 0.000 < 0.05, this means that there is an influence of leadership on work accidents at PT Barata Indonesia.

Tabel 6. Effect of Responsibility on Work Accidents

Responsibility	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	0	0,0	0	0,0	0	0,0
Reactive	20	19,8	7	4,9	27	11,1
Compliant	39	38,6	35	24,5	74	30,3
Proactive	39	38,6	88	61,5	127	52,0
Resilient	3	3,0	13	9,1	16	6,6
Total	101	100	143	100	244	100

P-value

0,000

Based on table 6, it shows that responsibility for Occupational Health and Safety with a reactive maturity level (the level of preventing similar incidents) has had the most work accidents, namely 19.8%, compared to never having work accidents, namely 4.9%. Responsibility for Occupational Health and Safety with a compliant maturity level (the level of accurately preventing incidents before they occur) has the most work accidents occurring, namely 38.6%, compared to never having work accidents, namely 24.5%. Responsibility for Occupational Health and Safety with the highest level of proactive maturity (level of improving the system) has never had a work accident, namely 61.5%, compared to the number of work accidents that have occurred, namely 38.6%. Responsibility for Occupational Health and Safety with a resilient maturity level (the level of the way we run our business) has the highest rate of never having a work accident, namely 9.1%, compared to having a work accident, namely 3.0%. P value = 0.000 < 0.05 this means that there is an influence of responsibility on work accidents at PT Barata Indonesia.

Tabel 7. Effect of Attachment and Involvement on Work Accidents

Attachment and Involvement	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	1	1,0	0	0,0	1	0,4
Reactive	15	14,9	4	2,8	19	7,8
Compliant	33	32,7	29	20,3	62	25,4
Proactive	48	47,5	86	60,1	134	54,9
Resilient	4	4,0	24	16,8	28	11,5
Total	101	100	143	100	244	100
P-value	0,000					

Based on table 7, it shows that the attachment and involvement in Occupational Health and Safety with a level of vulnerable maturity (accepting that the incident occurred) has the highest number of work accidents, namely 1.0%, compared to those who have never had work accidents, namely 0.0%. Attachment and involvement to Occupational Health and Safety with a level of reactive maturity (the level of preventing similar incidents from occurring) has the highest number of work accidents occurring, namely 14.9%, compared to never having a work accident, namely 2.8%. Attachment and involvement to Occupational Health and Safety with a compliant maturity level (the level of preventing incidents before they occur accurately) has the highest incidence of work accidents, namely 32.7%, compared to never having work accidents, namely 20.3%. Attachment and involvement in Occupational Health and Safety with the highest level of proactive maturity (level of improving the system) has never had a work accident, namely 60.1% compared to having had a work accident, namely 47.5%. Attachment and involvement to Occupational Health and Safety with a resilient maturity level (the level of how we run our business) has the highest rate of never having a work accident, namely 16.8%, compared to having a work accident, namely 4.0%. P value = 0.000 < 0.05, this means that there is an influence of attachment and involvement with work accidents at PT Barata Indonesia.

Tabel 8. Effect of Risk on Work Accidents

Risk	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	0	0,0	0	0,0	0	0,0
Reactive	18	17,8	6	4,2	24	9,8
Compliant	43	42,6	26	18,2	69	28,3
Proactive	38	37,6	91	63,6	129	52,9

Resilient	2	2,0	20	14,0	22	9,0
Total	101	100	143	100	244	100
P-value	0,000					

Based on table 8, it shows that the risk with the reactive maturity level (the level of preventing the occurrence of similar incidents) has the highest risk of having a work accident, namely 17.8% compared to never having a work accident, namely 4.2%. The risk with a compliant maturity level (the level of preventing incidents before they occur accurately) has the highest risk of having a work accident, namely 42.6%, compared to never having a work accident, namely 18.2%. The risk with the most proactive maturity level (level of improving the system) is never having a work accident, namely 63.6% compared to having a work accident, namely 37.6%. The risk with the most resilient maturity level (the level of how we run our business) is never having a work accident, namely 14.0%, compared to having a work accident, namely 2.0%. P value = 0.000 < 0.05, this means that there is a risk influence on work accidents at PT Barata Indonesia.

Tabel 9. Effect of Competence on Work Accidents

Competence	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	0	0,0	0	0,0	0	0,0
Reactive	17	16,8	6	4,2	23	9,4
Compliant	48	47,5	33	23,1	81	33,2
Proactive	34	33,7	85	59,4	119	48,8
Resilient	2	2,0	19	13,3	21	8,6
Total	101	100	143	100	244	100
P-value	0,000					

Based on table 9, it shows that competencies with a level of reactive maturity (the level of preventing similar incidents) have had the most work accidents, namely 16.8%, compared to those who have never had work accidents, namely 4.2%. Competencies with a compliant maturity level (the level of accurately preventing incidents before they occur) have the most work accidents, namely 47.5%, compared to those who have never had work accidents, namely 23.1%. Competencies with a level of proactive maturity (level of improving the system) have the highest number of work accidents, namely 59.4%, compared to work accidents that have occurred, namely 33.7%. Competencies with a resilient maturity level (the level of how we run our business) have the highest rate of never having a work accident, namely 13.3%, compared to having a work accident, namely 2.0%. P value = 0.000 < 0.05, this means that there is an influence of competence on work accidents at PT Barata Indonesia.

Tabel 10. Effect of Information and Communication on Work Accidents

Information and Communication	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	1	1,0	0	0,0	0	0,4
Reactive	11	10,9	6	4,2	17	7,0
Compliant	53	52,5	26	18,2	79	32,4
Proactive	32	31,7	97	67,8	129	52,9
Resilient	4	4,0	14	9,8	18	7,4
Total	101	100	143	100	244	100

P-value

0,000

Based on table 10, it shows that Occupational Health and Safety information and communication with a level of maturity that is vulnerable (accepting that the incident occurred) has had the most work accidents, namely 1.0%, compared to never having work accidents, namely 0.0%. Occupational Health and Safety information and communication with a reactive maturity level (the level of preventing similar incidents from occurring) has the most work accidents occurring, namely 10.9%, compared to never having work accidents, namely 4.2%. Occupational Health and Safety information and communication with a compliant maturity level (the level of accurately preventing incidents before they occur) has the most work accidents occurring, namely 52.5%, compared to never having work accidents, namely 18.2%. Occupational Health and Safety information and communication with the level of proactive maturity (level of improving the system) has the highest number of work accidents, namely 67.8%, compared to work accidents, namely 31.7%. Occupational Health and Safety information and communication with a resilient maturity level (the level of how we run our business) has the highest rate of never having a work accident, namely 9.8%, compared to having a work accident, namely 4.0%. P value = 0.000 < 0.05, this means that there is an influence of information and communication on work accidents at PT Barata Indonesia.

Tabel 11. Effect of Organizational Learning on Work Accidents

Organizational Learning	Work Accident				Total	
	Once		Never		f	%
	f	%	f	%		
Vulnerable	0	0,0	1	0,7	1	0,4
Reactive	18	17,8	5	3,5	23	9,4
Compliant	35	34,7	32	22,4	67	27,5
Proactive	45	44,6	84	58,7	129	52,9
Resilient	3	3,0	21	14,7	24	9,8
Total	101	100	143	100	244	100
P-value	0,000					

Based on table 11, it shows that learning organizations with a level of vulnerable maturity (accepting that incidents happen) have had the most cases of never having a work accident, namely 0.7%, compared to having a work accident, namely 0.0%. Learning organizations with a level of reactive maturity (the level of preventing similar incidents) have had the most work accidents, namely 17.8%, compared to those who have never had work accidents, namely 3.5%. Learning organizations with a compliant maturity level (the level of accurately preventing incidents before they occur) have had the most work accidents, namely 34.7%, compared to those who have never had work accidents, namely 22.4%. Organizational learning with a level of proactive maturity (level of improving the system) has the highest rate of never having a work accident, namely 58.7%, compared to having a work accident, namely 44.6%. Organizational learning with a resilient maturity level (the level of the way we run our business) has the highest rate of never having a work accident, namely 14.7%, compared to having a work accident, namely 3.0%. P value = 0.000 < 0.05, this means that there is an influence of organizational learning on work accidents at PT Barata Indonesia.

Multivariate Analysis

Tabel 12. Multivariate Analysis Result

Independent Variables	Exp(B)	P Value
Commitment	0,431	0,009
Leadership	1,855	0,040
Responsibility	1,974	0,015
Attachment and Involvement	0,448	0,014
Risk	3,187	0,001
Competence	2,109	0,035
Information and Communication	2,328	0,028

Learning Organization	0,469	0,028
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The inferential test results in Table 12 using multiple Logistic Regression analysis show that the risk variable has the highest Exp(B) value (3.187) compared to other variables. This means that risk is the most dominant factor in the maturity level of work safety culture which influences work accidents at PT Barata Indonesia.

DISCUSSION

Effect of Commitment on Work Accidents at PT Barata Indonesia

Based on the results of this research, the majority of workers assess the company's commitment to Occupational Health and Safety as being at a proactive level of maturity, this is because all workers feel that the unit management has established an Occupational Health and Safety regulatory policy and implemented a reward and punishment system in all areas of the unit in order to minimize work accidents, have processes in work safety aspects and carry out systematic checks when work is in progress, encourage workers to work in accordance with Occupational Health and Safety rules that have been created to minimize the occurrence of work accidents, and unit management is committed to ensuring that all types of work have been carried out by the majority worker. The results of this research are in line with research Tappura, Jääskeläinen and Pirhonen (2022), that the company's commitment to Occupational Health and Safety with a proactive level of maturity, the company does not only talk about safety, but is proactively committed, and is actually involved in safety activities (9). According to Ranganathan & Sujatha (2022), poor commitment is a common cause of failure found in the management hierarchy of work safety culture systems, thus management must be committed to safety and its commitment must be better known by all personnel (10).

Effect of Leadership on Work Accidents at PT Barata Indonesia

Based on the results of this research, Almost half of the workers assess that company leaders' concern for Occupational Health and Safety aspects is at a proactive level of maturity, this is because almost half of the workers feel that superiors actively go to the field to carry out plant-walkdowns in order to ensure the unit is in good condition. safe, ensure the availability of most (almost all) equipment that meets Occupational Health and Safety standards and carry out inspections during operation and maintenance, have good ways to encourage workers to work in accordance with Occupational Health and Safety aspects, and superiors often conduct Occupational Health and Safety speeches. The results of this research are strengthened by the results of research Liana et al (2022), which shows that safety culture maturity is at the proactive stage (58.0%) with leadership, risk management and safety compliance as the strongest indicators (11). The role of leaders is very important in supporting the successful implementation of work safety culture, leaders become role models in implementing work safety compliance based on regulations (12).

Effect of Responsibility on Work Accidents at PT Barata Indonesia

Based on the results of this research, the majority of workers responsibility for Occupational Health and Safety is at a proactive level of maturity, this is because most workers care and remind them in a good way and provide structured explanations when they see dangerous co-worker behavior. responsibility for maintaining and distributing the latest information regarding safe work procedures and disseminating them both formally and informally, and also for superiors to monitor the implementation of safe work methods for their subordinates both during overtime and on holidays. Worker responsibility towards Occupational Health and Safety with a proactive level of maturity, where workers take the initiative to follow safety rules and regulations and also help others during work operations (13). The implementation of a work accident risk control system by implementing a safe work permit system (SIKA) in every scope of work as well as the role of top management and best practice which always emphasizes that work safety and health is the responsibility of all workers which also leads to a reduction in the number of work accidents (14).

Effect of Attachment and Involvement on Work Accidents at PT Barata Indonesia

Based on the results of this research, the majority of workers attachment and involvement in Occupational Health and Safety are at a proactive level of maturity, this is because most workers contribute to the safety of colleagues in the work environment, there are vertical and horizontal communication systems that are free and open, which were scheduled and recorded, but there was no follow-up, and the Occupational Health and Safety team facilitated the participation/activity of the majority of workers (almost all work areas) in the Occupational Health and Safety coaching program. Research Rahman (2021), states that worker attachment and involvement in proactive, emotional Occupational Health and Safety by showing positive behavior such as enthusiasm and deep feelings makes it easier to achieve organizational or company goals (15). Workers who have high attachment and involvement towards Occupational Health and Safety are characterized by high levels of attendance, active involvement, strong attachment and are oriented towards achieving.

Effect of Risk on Work Accidents at PT Barata Indonesia

Based on the results of this research, the majority of workers assessments of risks in the work area are at a proactive level of maturity, this is because most workers feel that unit management has provided most of the tools or signs to mitigate hazards in all work areas, carry out risk management in a structured and systematic manner, apply detailed and structured information on shift hand overs to avoid accidents, and unit management carries out firm handling for systematic violations and violations will be dealt with firmly. The level of maturity of work safety culture with proactive stage risks according to Siuta (2022), is a characteristic of organizations that involve the workforce, and initiatives move from a purely top-down approach, a typical thing to consider safety as an inherent in work (16). Meaningful two-way communication is key to increasing hazard and risk awareness as it allows the necessary preventive behavior to be generated among workers, proactive identification and control of hazards and risk exposure is required under occupational health and safety legislation, but is also a milestone a productive safety culture that takes safety beyond legal compliance (17).

Effect of Competence on Work Accidents at PT Barata Indonesia

Based on the results of this research, almost half of worker competency assessments are at a proactive maturity level, this is because unit management prepares clear job descriptions relating to responsibilities, duties and job positions as a form of awareness of worker safety, providing education. periodically to the majority of workers to strengthen competency for risk control, look for all causes of accidents, not the person at fault, when an accident occurs, and workers receive work safety training that is appropriate to their type of work and has been implemented well but there has been no evaluation. Competence is the key to ensuring a good work safety culture, being proactive requires training/qualifying leaders and workers first, before they start their work, this also shows that no work or task should be carried out without the relevant work safety culture competency, and that occupational safety culture is an integral part of any job or profession, the development of occupational safety cultural competency should be an aspect of ongoing professional development, refresher training ensures that leaders' and workers' knowledge and skills regarding occupational safety culture remain current and include cultural insights new occupational safety (18). Overall worker competency is the worker's knowledge, understanding and responsibility for their work, as well as knowledge of the risks and dangers that can threaten workers in carrying out their work (19).

Effect of Information and Communication on Work Accidents at PT Barata Indonesia

Based on the results of this research, researchers assume that the majority of workers assessments regarding Occupational Health and Safety information and communication are at a proactive level of maturity, this is because most workers feel that safety is a topic of regular communication carried out to avoid work accidents, Occupational Health and Safety information media is used to detect safety problems before it is too late and work accidents occur, workers are given the opportunity to convey unsafe conditions and behavior to unit management at any time without waiting for a specific communication forum, and work instructions are written in clear and easy to understand language but are only placed in areas with risks high and medium danger. Information and communication for all workers is very important as a catalyst in accelerating responses related to Occupational Health and Safety (20). Proactive stage information and communication, is clear and constructive safety information and communication providing mechanisms by which knowledge and understanding can be improved to prevent risky behavior and to improve safety culture, this is illustrated by case studies that show how organizations respond to reduced performance of injured workers with various techniques work safety information and communication (21).

Effect of Learning Organization on Work Accidents at PT Barata Indonesia

Based on the results of this research, researchers assume that the majority of worker assessments regarding organizational learning are at a proactive level of maturity, this is because most workers feel that their superiors are open and responsive enough to provide feedback regarding performance, dangers or Occupational Health and Safety issues and are starting to prepare systems that facilitate the feedback process efficiently, frequently discuss knowledge and experience in the field of Occupational Health and Safety in all work operations in the work unit, share knowledge and experience about near miss incidents that occur in the work unit in a good and structured manner, and unit management analyzes near miss incidents in work areas with high and medium risk of accidents only. Organizational learning processes are identified as a vital component of safety culture. The characteristics of proactive organizational learning are having the desire and competence to translate appropriate requirements for a safety system and having the willingness to implement system changes if necessary. One of the characteristics of organizational learning is individual competence that is developed systematically (22). Organizational learning involves how the organization manages information, how the organization analyzes accidents and near misses in the workplace, and the organization informs workers about these incidents (23).

Dominant Factors in Work Safety Culture Maturity Model with Work Accidents

The results of the Logistic Regression analysis show that the risk variable has the highest Exp(B) value (3.187) compared to other variables, so risk is the most dominant factor in the maturity level of work safety culture which influences work accidents at PT Barata Indonesia. Management of Health and Safety at Work Regulations recommends principles in preventing work accidents, namely avoiding risks, evaluating risks that cannot be avoided, dealing with risks at the source, adapting work to individuals, adapting to technological advances, replacing dangerous ones with non-hazardous ones, develop comprehensive prevention policies, prioritize collective protective measures over individual protection, and provide appropriate instructions to workers (24). Indonesia has a policy that regulates workers' occupational safety and health through the implementation of SMK3 commitments which are implemented in daily work (25).

CONCLUSION

Commitment

A true commitment to safe behavior is developed by prioritizing safety as a full effort (24 hours) both on and off the job, but all of this relies on the idea that culture is a matter of individual attitudes (26).

Leadership

Research by Puruboyo and Djunaidi (2023), showing that related to the analysis of the maturity level of work safety culture, transformational and transactional safety leadership styles can positively influence worker behavior (safety behavior), and success can be measured from the presence of safety. leadership is the number of work accidents, apart from that, safety climate is also a priority for work safety, so a positive safety climate will motivate workers more to be engaged in work that prioritizes work safety compared to workers who are in a group with a negative safety climate (27).

Responsibility

Organizations with a positive safety culture ensure that all workers are aware of their responsibilities regarding safety, have a responsible worker attitude (responsibility) and care about the safety of co-workers and communicate information about things such as hazards, safety procedures and available assistance (28).

Attachment and Involvement

High levels of worker attachment and involvement in work safety can result in a safer work environment and reduce workplace accidents, incidents, and injuries, engaged workers are more likely to follow established safety procedures, talk about potential hazards, and actively participate in safety training (29).

Risk

Controlling the risk of work accidents must be pursued continuously through safety approaches, both modern through a systems approach and simply by installing signs, safety signs or encouraging workers to care about work safety (30).

Competence

The growth of this competency is closely related to company training regarding work and safety which will become a benchmark for how safety culture is implemented in the company (31).

Information and Communication

Work safety information and communication also ensures that worker behavior is monitored so that they are less likely to exhibit unsafe behavior (32).

Learning Organization

Work safety requires learning by groups and organizations as well as by individuals, learning occurs on the front line, where individuals and groups change routines to solve problems, these solutions may maintain safety, but can also overcome and mask underlying system problems (33).

RECOMMENDATION

For the Company

Provide additional equipment, standard operating procedures and provide personal protective equipment to reduce and prevent injuries to workers which impact the maturity of work safety culture.

For Workers

Discussion about safety in the workplace and strengthening safety culture in operations and work.

For Future Researchers

Expanding the scope of research related to the dominant factors in the maturity level of work safety culture and work accidents, for example based on the level of risk and adding other variables and items besides those used in this research.

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