

Assessment and Development of Safety Culture Maturity Level Model at PT Cahaya Anugerah Sentosa Makassar

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ABSTRACT : The problem of poor safety culture is one of the causes of work accidents. Until now, there are no specific safety culture maturity level measurement parameters, so a safety culture maturity level measuring tool has been developed that follows the characteristics of the industry/company. Safety culture measurement parameters must include psychological, behavioral, and situational aspects. The establishment of measuring tools for assessing safety culture maturity level also adapts to the conditions of K3 management and the legislation used by the Company. The assessment was carried out at one of the companies in Indonesia, namely PT. Cahaya Anugerah Sentosa Makassar. The safety culture maturity level assessment at PT Cahaya Anugerah Sentosa Makassar was carried out using a questionnaire that had a total of 30 questions covering psychological, behavioral, and situational aspects. Measurements are grouped into five dimensions, namely information and communication, commitment, organizational learning, leadership and involvement, and competence. The measurement/assessment results show that the safety culture maturity level value is at level 4, namely proactive. These results show that awareness of occupational safety and health is comprehensive at all job levels, with the management system starting to involve workers in the improvisational stage of K3 management and starting to change the purely top-bottom management approach to two-way communication.

Keywords - Occupational safety and health (K3), Safety Culture, Work Accidents, Safety culture maturity level

1. INTRODUCTION

Safety culture has its factors including transparent reporting culture, teamwork culture, commitment to organizational learning, effective communication, and management support that sustain and strengthen the organization's safety culture. This will be influenced by human factors, managerial systems and strategies, and communication systems and strategies [1]. At the organizational level, safety culture can be influenced by organizational and environmental factors. At the national and global levels, these factors must also be considered as political, social, and economic factors that lead to different safety culture outcomes [2].

Based on data from the World Safety Organization (WSO) Indonesia, it is recorded that 130 thousand accidents occur each year, with fatalities reaching 2,500 per year. This is because the Occupational Health and Safety (K3) culture in the workplace and companies is still lacking attention, even though the development of a K3 culture is important to prevent incidents and deaths due to accidents. The existence of the Indonesia Berbudaya K3

program as the main foundation for achieving World Class K3 performance which was launched since 2015, is a benchmark for the K3 Culture Maturity Level (safety culture maturity level) in each company [2].

The safety culture maturity level model has become a concern in various industrial sectors and has been studied by many researchers because it is used as a tool for organizational development, both as an assessment tool and as a tool for improvement [4]. The Hudson safety culture maturity model is usually used in organizations in high-risk industries, while the Fleming model for safety culture maturity is used in organizations in non-high-risk industries/companies. The framework for measuring safety culture maturity levels has also been widely developed and varies and is flexible and can be adjusted to suit the specific requirements and objectives of the organization and employees. While the methods used for the safety culture maturity level model, for example, questionnaires, interviews, literature reviews, and focus groups are always identified to develop, evaluate, and apply the maturity model [1][3].

Through the maturity level of the organization that is different from emerging that focuses on management development and commitment, the level of management that recognizes the importance of frontline staff and develops personal responsibility, involving levels that show staff who are well involved to develop cooperation and commitment in improving safety, the level of cooperation that develops consistency and fights complacency, and continues to improve what has existed with a proactive and risk-based approach to leadership, there is a direct influence on the safety culture of the organization [5], because most organizations assume that if their occupational safety performance is good, then automatically the safety process management system they have is also good. However, occupational safety is very different from the safety process [6].

This is the basis for conducting research at PT Cahaya Anugerah Sentosa, a company engaged in the food and beverage industry. The company/organization claims that their occupational safety performance is very good, so that the safety process management system they have is also good. However, the company/organization has never assessed and does not know what level the safety culture and maturity are at. In addition, although over the past two decades there has been a steady development in the use of the safety culture maturity level model to assess safety culture in various industries such as in previous studies, namely in the petrochemical industry in Brazil, the manufacturing industry in Iran, the health sector in the Philippines, and in the education sector in Kenya [7]. In Indonesia, until now safety culture maturity studies have only been commonly conducted in the mining and construction industries, which shows that understanding the concept of safety culture in this country still needs to be improved widely in various industrial sectors. Therefore, this study carries the title "Assessment of Safety Culture and Maturity Level at PT Anugerah Cahaya Sentosa Makassar".

2. METHOD

The study was conducted in a company with a total of 145 employees, using a mixed method with two approaches, namely quantitative research and qualitative research. In this study, the data used is primary data obtained from the results of filling out questionnaires by respondents. The sampling method was carried out by simple random sampling using the Slovin formula, 106 respondent samples were obtained. This quantitative analysis was carried out based on 2 indicators, namely aspects and dimensions. Data processing was carried out in 3 stages, namely the first stage by calculating the aspect value, the second stage by calculating the dimension value, and the third stage by calculating the safety culture maturity value. The assessment of the safety culture maturity level is based on the safety culture maturity level identification table in the Company.

Table 2.1 Scores at each Maturity Level

Kategori Tingkatan	Pathological	Reactive	Calculative	Proactive	Generative
Nilai	1	2	3	4	5

A qualitative approach is carried out to strengthen the analysis in quantitative research through in-depth interviews with informants who are stakeholders. The informants selected are people who know and can provide

information and play a role as policymakers related to organizational values and culture. Technical implementers of K3 activities, and field leaders who are in direct contact with workers in implementing K3.

3. RESULTS AND DISCUSSION

3.1 Calculation of Department Aspect Values

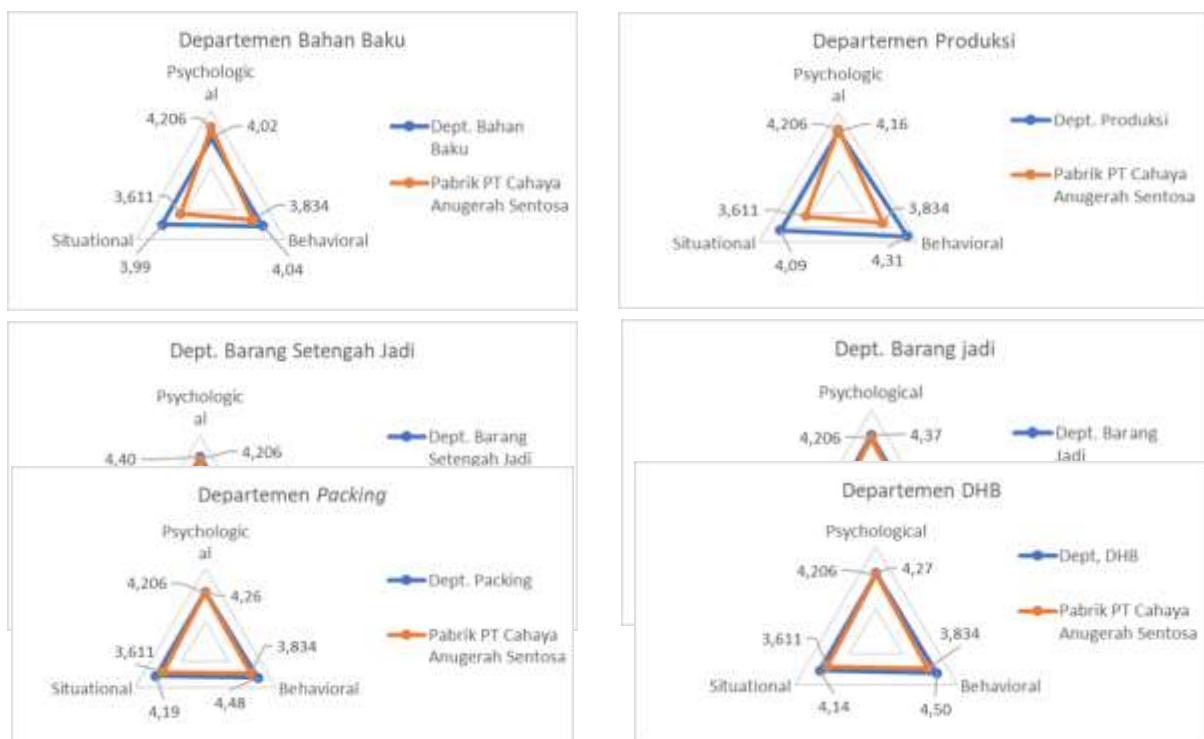
The calculation of aspect values is obtained from the average value of the psychological aspect, behavioral aspect, and situational aspect in the questionnaire. The questionnaire consists of 30 questions representing the 3 aspects, where each aspect has 10 questions. The calculation of aspect values is carried out in each department and for the overall value of the company so that the results are obtained as in Table 3.1 below.

Table 3.1 Results of Department Aspect Value Calculations

Departemen	Psychological	Behavioral	Situational
BahanBaku	4,02	4,04	3,99
Produksi	4,16	4,31	4,09
Barang Setengah Jadi	4,40	4,70	4,37
Barang Jadi	4,37	4,56	4,19
Packing	4,26	4,48	4,19
DHB	4,27	4,50	4,14
Unit Instalasi	4,17	4,30	4,13
Unit Mekanik	4,00	4,34	3,98
Pabrik PT Cahaya Anugerah Sentosa	4,206	3,834	3,611

Table 3.1 shows the situational aspect in the mechanical unit with a value of 3.98 and the highest value in the behavioral aspect in the semi-finished goods department with a value of 4.70. While the overall value of aspects in one department, it is known that the department in the PT Cahaya Sentosa factory has a psychological aspect value of 4.206, a behavioral aspect value of 3.834, and a situational aspect value of 3.611.

A comparison of aspect values from each department is then compared to the overall aspect value displayed visually using a radar chart can be seen below.





3.2 Calculation of Dimension Values

The calculation of the dimension value is first approached using the Analysis Hierarchy Process (AHP) method involving expert judgment from the K3 department. 2 experts are respondents, where expert 1 is coordinator 1 and expert 2 is coordinator 2 from the K3 department. The expert judgment value is taken by providing a value weighting questionnaire as in the attachment. The results of the questionnaire in the division of proportions by each expert judgment are as follows:

Table 3.2 Expert 1 Questionnaire Results

	Psychological	Behavioral	Situational
Psychological	0	0,13	0,13
Behavioral	8	0	0,11
Situational	8	9	0
Total	16	9	0,24

	Psychological	Behavioral	Situational
Psychological	0,00	0,01	0,53
Behavioral	0,50	0,00	0,47
Situational	0,50	0,99	0,00
Total	1	1	1

	P. Vektor	Bobot
Psychological	0,54	0,18
Behavioral	0,97	0,32
Situational	1,49	0,50
Total	3	1

Table 3.3 Expert 2 Questionnaire Results

	Psychological	Behavioral	Situational
Psychological	0	0,14	0,50
Behavioral	7	0	0,11
Situational	2	9	0
Total	9	9,14	0,61

	Psychological	Behavioral	Situational
Psychological	0,00	0,02	0,82
Behavioral	0,78	0,00	0,18
Situational	0,22	0,98	0,00
Total	1	1	1

	P. Vektor	Bobot
Psychological	0,83	0,28
Behavioral	0,96	0,32
Situational	1,21	0,40
Total	3	1

The proportion/weight value used is a combination of all proportions given by each expert. This proportion/weight is obtained from the average of all expert proportion/weight values. So the proportion/weight of the aspects used are as follows:

Table 3.4 Proportion/Weight of Combined Aspects

	Kord. 1	Kord.2	Rata-rata
<i>Psychological</i>	0.18	0.28	0.23
<i>Behavioral</i>	0.32	0.32	0.32
<i>Situational</i>	0.50	0.40	0.45

The calculation of dimension values is carried out in each department and for the overall value of the company using the average value of expert judgment. The following are the results of the calculation of aspect values in each work unit.

Table 3.5 Results of Department Dimension Value Calculations

Departemen	Information and Communication	Commitment	Organizational Learning	Involvement	Competence
BahanBaku	4,01	4,08	4,08	3,94	3,94
Produksi	4,10	4,24	4,20	4,18	4,17
Barang Setengah Jadi	4,27	4,54	4,38	4,51	4,71
Barang Jadi	4,22	4,43	4,37	4,34	4,39
<i>Packing</i>	4,13	4,31	4,23	4,32	4,51
DHB	4,18	4,34	4,31	4,27	4,33
Unit Instalasi	4,22	4,26	4,20	4,26	4,03
Unit Mekanik	4,03	4,09	4,06	4,15	4,16
PT Cahaya Anugerah Sentosa	4,15	4,29	4,23	4,25	4,28

Based on the calculation results above, it is known that the lowest dimension value is the involvement and competence dimension in the raw material department with a value of 3.94 and the highest value in the competence dimension in the packing department with a value of 4.51. While the overall value of the dimensions in one department, it is known that the department in the PT Cahaya Sentosa factory has an information & communication dimension value of 4.15, a commitment dimension value of 4.29, an organizational learning dimension value of 4.23, an involvement dimension value of 4.25, and a competence dimension value of 4.28. The comparison of aspect values from each department is then compared to the overall aspect value displayed visually using a radar chart which can be seen below.



3.3 Calculation Safety Culture Maturity Value Level of Department

Table 3.6 Results of Calculation of Safety Culture Maturity Values for Each Department

Departemen	Maturity Level
BahanBaku	4,01
Produksi	4,18
Barang Setengah Jadi	4,48
Barang Jadi	4,35
Packing	4,30
DHB	4,29
Unit Instalasi	4,19
Unit Mekanik	4,10

Based on the results above, the safety maturity culture level value in the work unit/department is in the range of 4.01 to 4.48. The lowest value is in the Raw Materials department. While the highest value is in the Semi-Finished Goods department (*Departemen Barang Setengah Jadi*).

3.4 Calculation of Company Safety Culture Maturity Level Value

The previous calculation is a stage carried out to find the dimension value, aspect value, and safety maturity level value in each department. Based on this data, the calculation of the value is carried out at the company level using the average value of each work unit. The following are the dimension values, aspect values, and safety maturity level values of the company.

Table 3.7 Results of Calculation of Company Safety Maturity Level Values

Aspek			Dimensi					Maturity
Psy	Bln	Sit	IC	Comt	OL	Inv	Comp	
4,21	3,83	3,61	4,15	4,29	4,23	4,25	4,28	4,10

Overall, the company's safety maturity level value is 4.10. This value is at the proactive level, indicating that the company generally has OHS management with management system management starting to involve workers in the OHS management improvisation stage. Worker awareness and involvement in OHS management begins to change the pure top-bottom management approach to two-way communication. This means that management not only cares about safety issues, but employees have begun to give their opinions regarding safety management in the work area. This is directly proportional to the highest value in the dimension, namely commitment. Although the calculation results above show the lowest dimension value is the information and communication dimension. As for the aspect value, the highest value is the psychology aspect and the lowest aspect is situational.

4. CONCLUSION

The measurement of safety culture maturity level at PT Cahaya Anugerah Sentosa Makassar was conducted using a questionnaire that had 30 questions covering psychological, behavioral, and situational aspects. The measurements were grouped into five dimensions, namely information and communication, commitment, organizational learning, leadership and involvement and competence. using a mixed method with two approaches, namely quantitative research and qualitative research. In this study, the data used were primary data obtained from the results of filling out the questionnaire by respondents. This quantitative analysis was carried out based on 2 indicators, namely aspects and dimensions.

Data processing is carried out in 3 stages, namely the first stage by calculating the aspect value, the second stage by calculating the dimension value, and the third stage by calculating the safety culture maturity value. The result of the calculation of the safety culture maturity level value is 4.10. The value shows that the company's safety culture is at the proactive level, which shows that awareness of occupational safety and health is comprehensive at all levels of office, with the management of the management system starting to involve

workers in the improvisation stage of K3 management and starting to change the pure top-bottom management approach to two-way communication.

5. REFERENCES

- [1] R. Wendler, "The maturity of maturity model research: A systematic mapping study," in *Information and Software Technology*, Dec. 2012, vol. 54, no. 12, pp. 1317–1339. doi: 10.1016/j.infsof.2012.07.007.
- [2] Redaksi Jurnal Industry, "WSO Indonesia Safety Culture Award 2022 Berikan Penghargaan bagi Perusahaan yang Utamakan K3," Feb. 25, 2022.
- [3] W. L. Frank, "Process safety culture in the CCPS risk based process safety model," *Process Safety Progress*, vol. 26, no. 3, pp. 203–208, Sep. 2007, doi: 10.1002/prs.10201.
- [4] M. M. Morales and E. D. Estioko, "Perceptions of Nurse Managers on Patient Safety Culture and Safety Culture Maturity Level of Selected Internationally Accredited Hospitals in Metro Manila, Philippines," *Asia Pacific Journal of Academic Research in Social Sciences*, vol. 5, no. 2, pp. 8–17, 2020, [Online]. Available: www.apjarss.org.
- [5] P. Jurnal Kesehatan Masyarakat, H. Musyaddad Abdul Aziz, Z. Djunaidi, D. Keselamatan dan Kesehatan Kerja, F. Kesehatan Masyarakat, and U. Indonesia, "KAJIAN LITERATUR SISTEMATIS MODEL TINGKAT KEMATANGAN BUDAYA KESELAMATAN (SAFETY CULTURE MATURITY MODEL) DI BERBAGAI SEKTOR INDUSTRI-SISTEMATIK REVIEW," vol. 6, no. 1, 2022.
- [6] A. P. G. Filho, J. C. S. Andrade, and M. M. de O. Marinho, "A safety culture maturity model for petrochemical companies in Brazil," *Saf Sci*, vol. 48, no. 5, pp. 615–624, Jun. 2010, doi: 10.1016/j.ssci.2010.01.012.
- [7] P. M. Njeru, J. T. Mailutha, E. Gatebe, and C. Mburu, "EVALUATION OF SAFETY CULTURE MATURITY LEVELS OF THE UNIVERSITIES IN KENYA."
- [8] M. Es'haghi and P. Sepehr, "Establishing of Participation Maturity System in Safety Management by Using Safety Culture Maturity Model through Targeted Hazard Identification System (THIS) Technique," 2015. [Online]. Available: <http://ijoh.tums.ac.ir>
- [9] A. Sudiarno and A. A. C. Sudarni, "Assessment of Safety Culture Maturity Level in Production Area of a Steel Manufacturer," in *IOP Conference Series: Materials Science and Engineering*, May 2020, vol. 847, no. 1. doi: 10.1088/1757-899X/847/1/012076.
- [10] J. R. D. Edwards, J. Davey, and K. Armstrong, "Returning to the roots of culture: A review and re-conceptualisation of safety culture," *Safety Science*, vol. 55, pp. 70–80, Jun. 2013. doi: 10.1016/j.ssci.2013.01.004.

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