



SAFETY CULTURE AWARENESS AND PRACTICES IN THE MALAYSIAN MINING INDUSTRY: A PRELIMINARY STUDY

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Abstract— Presently, safety culture is receiving attention for the prevention of mining disaster or accidents. The mining industry in Malaysia has been around for 200 years and fortunately, to date, there is no large-scale mining disaster that has occurred in Malaysia. However, that led to a lack of study on the safety culture in Malaysian mining industry. The study aims at exploring the current status of safety culture awareness and practices in Malaysian mining industry. A qualitative, open-ended interview session was conducted in April 2021 via the online

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<p>mining accident, safety culture awareness, small-scale mining operation</p>	<p>Google Meet platform. Six mining experts had agreed and volunteered to be involved in the interview session. Three themes were created: (1) Significance of safety culture in mining; (2) Factors that make up the safety culture in mining industry; and (3) Adopting safety culture in mining industry. Three themes and eight sub-themes were validated by the mining expert interviewers. In conclusion, the current status of safety culture awareness and practices in mining industry is very low. It was observed that there was a huge gap between small-scale and large-scale mining operation in Malaysia. For small-scale mining operation, it was below 50%, where one of expert claimed it to be approximately 30%. It is recommended that the top management of mining companies have their mindset changed, not only focusing on the profit but to strengthen the safety aspects as well. A good safety culture will increase the workers and operational productivities and prevent mining accident or disaster in Malaysia in the near future.</p>
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I. Introduction

The development of mining industry in Malaysia has been around for 200 years and fortunately, there is no large-scale mining disaster occurred in Malaysia. However, there are

still some accidents and fatalities that occur at the mine site. For example, in year 2019, there were 203 accidents in mining and quarry sectors with 9 fatalities were reported by Department of Occupational

Safety and Health Malaysia [1]. This number is considered small, compared to mining accidents or disasters known as the Soma Mine Disaster that occurred in Turkey had killed 301 people, in which it was deemed to be the worst mine disaster in Turkey's history [2].

The necessity to implement a good safety culture at workplace has become one of the national agenda by Malaysian government. For example, Occupational Safety and Health Master Plan 2020 (OSHMP 2020) was introduced to inculcate a safe and healthy work culture for the well-being of workers, employers, and the country. Therefore, the aim of the qualitative study is to investigate the current status of safety culture awareness and practices in the Malaysian mining industry.

II. Literature Review

The awareness to prevent mining disaster or accidents has raised in Malaysian mining industry. The necessity to implement a good safety culture at workplace has become one of

the national agenda by Malaysian government. For example, Occupational Safety and Health Master Plan 2020 (OSHMP 2020) was introduced to inculcate a safe and healthy work culture for the well-being of workers, employers, and the country. Furthermore, Social Security Organisation of Malaysia (SOCSO) has introduced a Vision Zero, which is a strategic approach for preventing workplace accidents, and promoting health and well-being of employees [1]. The philosophy of Vision Zero is that all occupational accidents, injuries, and diseases are preventable. It promotes a culture of prevention where everyone, not only employees and employers, must not accept accidents as inevitable. Accidents are preventable and must be avoided.

The scarce research in literature review or scientific publication focusing on the safety culture in mining industry in Malaysia, as shown in Table 1, has driven the author to investigate the safety culture in mining industry. Therefore, the

aim of the qualitative study is to investigate the current status of safety culture awareness and

practices in Malaysian mining industry by interviewing the mining experts in Malaysia.

Table 1: Comparison of safety culture study in Malaysian industries from various journal databases for the past 20 years (year 2001–2020) [3-5]

Industry	Journal Databases		
	Science Direct [3]	Emerald [4]	Scopus [5]
Mining	0	0	0
Construction	3	8	7
Petroleum/ oil and gas	2	1	5
Electronic	1	0	1
Manufacturing	1	7	9
Aircraft industry	1	0	1
Radiation (nuclear)	2	0	2
Education	1	0	7
Healthcare (hospital and pharmacist)	0	3	14
Small medium enterprise	0	2	2
Food	0	3	1
Automotive	0	1	0
Others (public sectors, private sectors, port industry, road industry, environment, tourism, review papers)	0	8	18

III. Methodology

This work involved an open-ended qualitative interview session, which was performed via the Google Meet platform in March and April 2021. Open-ended questions employed in the study aimed to obtain respondent’s thoughts, perceptions, and experience on

the safety culture in mining industry in Malaysia.

There were ten invitation letters (UMP.17.04/13.11/1/7) for participation in this preliminary study that were sent via email and six mining experts (R1 to R6) were agreed to share their experience on safety culture in mining industry. The mining experts have 10 to 35

working experience in the mining industry. Prior to the start of the interviews, all experts provided their verbal consent. The first author informed the respondents on the objectives of the study and guaranteed confidentiality of their detailed personal background. The possibility of withdrawing from the study at any time was also ensured. The duration of the individual interviews was between 30–45 minutes. Interviews were recorded, transcribed, and analyzed.

IV. Results

The overall purpose of the preliminary study was to investigate the current status of safety culture awareness and practices in mining industry in Malaysia by interviewing mining experts. To the best of the authors' knowledge, this was the first qualitative study on this topic undertaken in Malaysia. The mining experts portrayed their concern on safety culture awareness and practices, which is still low, especially for small-scale mining operation. The

output of the interview session mainly described the mining experts' views and experience in mining industry and the significance to inculcate safety culture in mining industry in Malaysia. The thematic analysis [6] was used to analyse the findings. Three themes and eight sub-themes were generated based on experts' responses as shown in Figure 1.

A. Theme 1: Significance of Safety Culture in Mining

All mining experts acknowledged the significant to promote a good safety culture in Malaysian mining industry. This theme generated two sub-themes:

(i) Self- definition about safety culture

Respondents expressed their understanding and perspective on the definition of safety culture in mining industry in Malaysia.

“Safety culture in mining industry should consists of five main elements:

- Value: we set objective and target and built from there;

- Attitude: open-minded, honest communication;
- Perception: it is a team effort and not a one man's job, every level of management share responsibility and can be accountable for;
- Competency-competent Safety Health Officer (SHO) and first aider, appointed Safety Health Committee (SHC) and Emergency Response Team (ERT); and
- Patterns of behaviour — complying with safety rules and regulation, safety reminder from time to time, instruction when necessary.” (R4)

“A safety culture is a value and priority that is the responsibility of all individuals in an organisation to other employees or the work environment which will bring results if consistently implemented. These values include personal responsibility, continuously implementing safety behaviour, communicating and raising awareness of safety issues and striving to learn more actively, yielding results if done consistently. Safety culture can also be defined as the way individuals in an organisation behave as a result of the influence of beliefs, practices, and attitudes.” (R5).

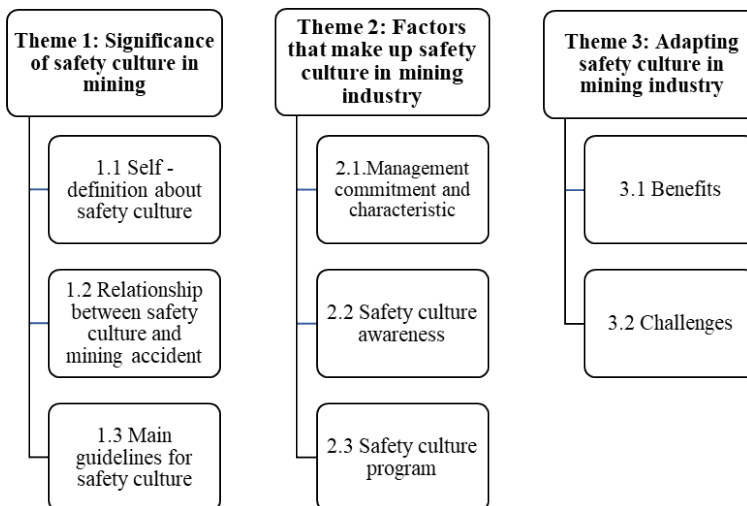


Figure 1: Themes and sub-themes on safety culture in Malaysian mining industry

B. Theme 2: Factors that make up Safety Culture in Mining Industry

The respondents agreed that the identification of key factors of safety culture is useful in preventing major accident or disaster in mining industry. This theme generated three sub-themes as follow:

(i) Management commitment and characteristics

Six respondents noted the management commitment is crucial in fostering a good safety culture.

“Management commitment is very important to construct safety culture” (R1)

“Company must ensure (R2):

- Commitment and priority by top management on safety;
- Safety incentives;
- Proper communication, e.g., Safety Officer, Management meeting;
- Transparency and carry out investment in safety equipment;
- Enforce standard operating procedure (SOP) or follow standards;

- Staff attitude and behaviour; and
- Proactive and empowered to make the right decisions

“Management commitment such as providing personal protective equipment (PPE), training, safety budget.” (R3).

(ii) Safety culture awareness

The six respondents highlighted that the safety culture awareness in mining industry is very low for small- and medium-scale mining operations, compared to large-scale operations.

“There is no safety culture awareness for small-scale mining operation due to financial constraint and their mentality that safety is not their priority. I can say that maybe 30% the awareness exists but their focus is the profit. However, for large-scale mining operations, it can be up to 70%.” (R1)

“The level of safety culture awareness in mining organisations is still at a low level below 50%, especially among small and medium

companies, such as in most mining areas in Pahang, Kelantan, and Perak.” (R5)

(iii) Safety culture program

The respondents mentioned there were an effort from government to foster safety culture in mining industry nowadays such as:

“In general, the Minerals and Geoscience Department Malaysia (JMG) has conducted a rating programme (audit) known as the Sustainability Rating of the Mining and Quarrying Industry. Regarding the rating, among the things evaluated are aspects of safety practices and culture in mines. The programme is conducted annually from 2019 until present.” (R5)

However, the examples of safety programme that can contribute to safety culture in mining industry also depends on the initiatives of mine company itself such as:

“Safety briefing on Covid-19 outbreak and control measures safety briefing coal transport, toolbox meeting, Return-to-Work programme by Social Security Organisation (SOCSO),

Noise and hearing conservation programme, Personal Protective Equipment (PPE) awareness: hearing protection device and respirator mask, noise hazard, exposure and risk at workplace; PPE awareness and workshop training or audit operator caterpillar by caterpillar agent; basic first aid and CPR course; Hazard Identification, Risk Assessment and Risk Control (HIRARC), Environmental Impact Assessment (EIA)workshop, fire drill training.” (R4)

C. Theme 3: Adapting safety culture in mining industry

The six respondents highly recommended the safety culture, in which they asserted that it is a must in the mining industry. This theme has two main subthemes as discussed below:

(i) Benefits of promoting safety culture

The main aim of safety culture is to prevent accidents or disaster. Six respondents mentioned the benefits of promoting safety culture in mining industry:

“(a) Protect health and safety of all workers and staff including

contractors and part timers, for immediate accidents and environmental pollution, and for long term exposure to dust or radiation, causing lung diseases or cancer, et cetera. (b) Ensure compliance to local safety and environmental laws, so authorities will not shut you down, and take legal action for environmental damage, accidents or loss of life.” (R2)

“To avoid accident and prevent recurrence, motivation to do a good job and to grow professionally, increase in productivity, and reduce downtime.” (R4)

(ii) Challenges in promoting safety culture in mining industry
The challenges and barriers in mining industries to promoting a safety culture are as follows:

“Enforcement must be done frequently by local authority.” (R1)

“(a) Mine company usually hires local communities with little care or knowledge of mining and safety laws involved; (b) Overzealous politicians wanting the local community to benefit so overriding or approving laws for mining without due

procedures or relevant authorities concerned, for instance, the Mineral and Geoscience Department Malaysia (JMG).” (R2)

“Change the mindset of mining players/practitioners. Safety is a long-term investment, not a burden to a mine company.” (R3)

V. Discussion

The overall purpose of the preliminary study was to investigate the current status of safety culture awareness and practices in mining industry in Malaysia by interviewing mining experts. To the best of the authors' knowledge, this was the first qualitative study on this topic undertaken in Malaysia. The mining experts portrayed their concern on safety culture awareness and practices, which is still low, especially small-scale mining operation.

In addition, the main challenge of mine owner or mine operator was that they did not understand how safety can be the best investment for their company. This results in owners experiencing some burdens, leading them to the preferable

option of cutting down the safety allocation or safety budget. Eagerness to obtain profit or a fast rate of return also contributes to the negligence of safety aspects at mine companies, especially for small-scale mining operation. Financial constraint was always their excuse. For example, they did not provide proper personal protective equipment (PPE), safety training and safety

programme to their workers. Therefore, the establishment of safety culture among mine workers becomes more difficult. Furthermore, these findings agree with similar studies conducted in mining industry in China [7], Australia [8], Ghana [9]. Table 2 shows the summary of most barriers in the construction of safety culture in the mining industry.

Table 2: Some identified barriers of safety culture awareness and practices

Barriers	Explanation
1. The mindset of mine owner and mine workers	The readiness of mine owner and mine workers to accept the concept of safety culture and understand this is a way or strategy to reduce mine accidents [7-8].
2. Lack of safety culture knowledge	Poor safety knowledge could lead to mine accidents. This includes poor safety training given by mine company to their workers could hinder in develop a safety culture at mine site [10].
3. Safety training	To make sure the mine workers understand on safety culture concept, the mine owner should provide a good safety training to the workers [11].
4. Poor communication channel from top management	Lack of effective communication channel between top management and mine worker [10].
5. Poor safety regulation	Poor enforcement on safety rules could hinder the implementation of safety culture at mine site. Poor supervision also contributes to poor safety rules [9,12]
6. Safety equipment	Insufficient personal safety equipment provided by management [2,12]
7. <i>Safety investment</i>	Mine company cut down the safety allocation or safety budget [13]

VI. Conclusion

In this study, six mining experts revealed the current status of safety culture in the mining industry. There was a huge gap on safety culture awareness and practices between small-scale and large-scale mining operations in Malaysia. For small-scale mining operation, it was below 50% and one of expert said around 30%. However, the large-scale mining operation is up to 70%. Integrated efforts from the Government, mine owners and workers, and local authority are crucial to establishing a positive safety culture in the Malaysian mining industry.

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