

Latest Risk Management Strategies for the Mining Industry in South Kalimantan : An Overview

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Abstract :

This research analyzes current risk management strategies relevant to the mining industry in South Kalimantan, with a focus on mitigating negative impacts on the environment and local communities. Through a qualitative approach that includes a literature review and objective situation analysis of the assisted communities, this study aims to identify best practices in effective risk management. The research results highlight the importance of integrating cutting-edge technology, such as data analysis and the Internet of Things (IoT), in improving safety and cleanliness in the workplace (K3). Apart from that, continuous training for employees is also considered a crucial step in increasing awareness and responsibility for K3. The importance of a deep understanding of geotechnical conditions was also emphasized, especially in dealing with potential risks such as landslides. Strong partnerships between companies, governments and local communities are also considered important in managing environmental risks effectively. By adopting a sustainable approach that focuses on technology, training and partnerships, the mining industry in South Kalimantan can maintain a balance between economic growth and environmental conservation. In conclusion, an integrated and proactive risk management strategy is needed to ensure the sustainability of the mining industry while still paying attention to the resulting social and environmental impacts.

Keywords: Mining Industry, Risk Management, South Kalimantan

A. INTRODUCTION

During the entire decision-making process, risk becomes an integral part of all company activities. Risk is the possibility of an outcome that is undesirable or contrary to the objective. When the outcome of the decision is uncertain, there is a risk. Generally, people associate danger with negative impacts. One common form of risk expression is "considered risk". Special events, changes in circumstances, consequences of such events, or combinations of such events are examples of ways in which risk is described in the context of achieving a goal. Risk is generally defined as anything that can affect the achievement of organizational goals (Sampe, 2023).

Today, companies are facing various changes, both in the business context and the environment. The company is able to improve its ability to adapt to changes in the environment due to the speed and uncertainty of such changes. Risk management is one of the important components in the management of companies and organizations today. Therefore, having tools available for risk management will be beneficial in the face of the rapid changes that occur in today's business and organizational world. Companies in Indonesia are currently facing similar challenges. To cope with rapid and complex environmental changes, risk management must be implemented effectively by organizations, both at the regional and national levels (Sampe, 2023).

Managing risk involves carrying out the tasks required by a leader to deal with possible dangers, especially those that arise within a family, company, or organizational environment. This includes planning, organizing, organizing, organizing, leading, and coordinating programs to reduce risk. In the context of risk management, these tasks include: identifying risks, measuring or calculating risk levels, finding ways to manage or address risks, developing strategies to reduce or control risks, coordinating the implementation of risk mitigation measures, and evaluating the effectiveness of risk mitigation programs (Subagiyo et al., 2020).

According to Rahman (2015), the risk management process consists of the following steps: (1) risk identification; (2) risk analysis; (3) selection of techniques; (4) strategy selection; and (5) control. Strategic hazards must be avoided, while operational hazards must be identified and controlled. If resources are limited, risk analysis can only be carried out on risks that have significant consequences and require the selection of techniques to address them. Everyone in the company must be aware of the company's risk management goals (Pratiwi & Kurniawan, 2018).

Factors inside and outside the company are what drive companies to engage in the risk management process. External factors can be in the form of government policies, both on a national and global scale, while internal factors generally consist of potential financial problems and associated costs, low revenue performance, growth opportunities, and reliance on the board of directors. Companies with good management are ready to take risks. The fact that every company is able to continue to exist in the market is closely

related to its ability to control the various risks that arise in every aspect of its business. Companies must be able to manage risk in the most effective way if they want to achieve their goals (Sianitawati & Prasetyo, 2022).

The mining industry in South Kalimantan has a vital role in Indonesia's regional and national economy. However, the industry also faces various risks that can affect business operations and sustainability. These risks include fluctuations in commodity prices, environmental issues, and socio-economic challenges faced by the communities around the mine. This background emphasizes the importance of effective risk management to maintain sustainability and mutual well-being.

B. LITERATURE REVIEW

Research (Ramadhan & Jati, 2019), states that the mining industry is known for its high risk, large capital requirements, and high technological complexity. Therefore, the application of Occupational Safety and Health (K3) in mining activities is very necessary to ensure effective operations and avoid accidents and occupational diseases.

In addition, in a study conducted by Zain (2017), the operational risk analysis for PT Aneka Tambang (ANTAM) Tbk emphasized the importance of risk management to ensure the continuity and success of the company in the mining industry. ANTAM engages a wide range of stakeholders, including its board of directors and executive management, in implementing the appropriate approach to identify, measure, and monitor risks associated with its operations. The company has built a deep attitude towards risk by complying with regulations and implementing best practices in the industry. Thus, the company not only maintains its operational integrity, but also positions itself as a strong player in the industry, as it is able to take advantage of opportunities and overcome challenges intelligently.

The main problem faced is how the mining industry can develop risk management strategies that are adaptive and responsive to current conditions. The purpose of this study is to identify and analyze effective risk management strategies for the mining industry in South Kalimantan, as well as provide recommendations based on the objective situation analysis of assisted communities, namely communities directly affected by mining activities.

In the analysis of the situation, it was found that many people depend on the mining sector for their livelihoods, but are also exposed to environmental risks such as water and soil pollution. The main issue that is the focus of the service is how to minimize the negative impact of mining activities on the environment and society. The selection of this service subject is based on the urgency of improving the quality of life of the community and the need to maintain environmental sustainability. Thus, this article is expected to make a real contribution to the development of a

more effective and sustainable risk management strategy for the mining industry in South Kalimantan.

C. RESEARCH METHODS

This research method uses a qualitative approach through *literature review* to review the latest risk management strategies in the mining industry in South Kalimantan. The research subjects include local communities and mining industry players in the region. The data analysis method uses the Miles and Huberman analysis method which consists of three models, namely: data reduction, data presentation, and conclusion drawn, each of which aims to select, focus, and transform data; presenting structured information to draw accurate conclusions; and draw conclusions from the data that has been collected. Data collection uses secondary data from books, scientific journals, industry reports, and other relevant sources, as well as qualitative data analysis to identify patterns and best practices.

D. RESULTS AND DISCUSSION

The role that the mining industry plays in the development of a country is very important. Not only in the fiscal, monetary, and real sectors, but also in other parts of the national economy, the mining industry is an important component. It is clear that mining is one of the sources of income for the state. The industry contributes to regional development, either through profits funds or through community development or corporate social responsibility (CSR) programs. The industry creates a surplus in the trade balance and increases investment. In addition, mining has a positive impact on the workforce. The industry is also a major contributor to the composite stock price index. This industry is characterized by high risk, requires large capital, and high technological complexity (Ramadhan & Jati, 2019).

The latest risk management strategy for the mining industry in South Kalimantan includes a variety of approaches that integrate cutting-edge technology and the participation of all stakeholders. One strategic approach is the application of technology systems for workplace safety and hygiene management (K3), such as data analysis and the Internet of Things (IoT). Sensors installed on equipment and work environments allow companies to monitor conditions in real-time and detect potential hazards before they occur. Data analysis also allows for better evaluation of accident trends and the implementation of preventive measures, making monitoring more proactive rather than reactive.

Any strategy for managing risk includes not only technology, but also ongoing training for employees. Emergency simulations and training in handling hazardous materials, as well as improved procedures for safe work practices, are all included in the training program. It is hoped that the formation of a strong attitude towards K3 through this training program will increase the awareness and responsibility of

individuals in maintaining the safety of themselves and their colleagues. Thus, all employees, from managers to field operators, agree on the importance of maintaining safety and minimizing risks in the workplace.

Assessment and management of potential hazards to the environment is also part of risk management. Given that mines have a significant impact on the surrounding environment, it is important to have a sustainable strategy in place in addressing the environment. These efforts include effective waste management, rehabilitation of areas after exploitation, and regular monitoring of air and water quality. By complying with strict regulations, industries in South Kalimantan can reduce their negative impact on the environment. Strategies for effective and comprehensive risk management for the modern offshore industry are created by combining technology, training, and environmental mitigation approaches (Nailiya Nikmah & Akhmad Zaki Yamani, 2022).

In a study conducted by (Sianitawati & Prasetyo, 2022), it was found that PT Bara Indonesia Tbk. can apply the ISO 31000:2018 approach because the company's risk management is currently still at the "awareness" level. Therefore, the risk management design process in accordance with ISO 31000:2018 will be suitable for the company because it covers all its operations. The results of the risk analysis showed that there were 105 risks identified at the enterprise level, and 35 of them exceeded the risk threshold acceptable to the company, indicating that the company needed to handle the risks. Three options are given to address 35 priority risks. For the high-risk category, a PREVENT & MITIGATION strategy is given, which involves duplication, improvement of SOPs, risk transfer, and risk control. For the high-risk category, a MITIGATION strategy is also given, which includes the installation of new technologies, diversification, and duplication. PREVENTION with diversification strategies and improvement of standard operating procedures (SOPs) and systems is an option for moderate risk. (Sianitawati & Prasetyo, 2022). In addition, it is necessary to pay attention to the implementation aspects of the strategy effectively and efficiently. Measures such as duplication, improved SOPs, and risk control will require good coordination between various departments and internal stakeholders. Meanwhile, the use of new technologies and diversification also requires prudent investment and careful monitoring of their impacts. Thus, in addition to identifying risks, effective risk management also involves constant monitoring and evaluation of the strategies implemented, as well as the ability to adapt to changes in the external and internal environment that may affect the company's risks.

Many countries have realized that transparency in mining activities helps boost economies and reduce the risk of conflict and corruption associated with mining activities. Given that its benefits can be used to improve the general welfare of the community, mining is one of the important resources that is able to support

development at both the national and regional levels (Bachruddin & Saraswati, 2021).

Research by Putrawiyanta & Indriany (2021) shows that the risk management strategy implemented by PT. Senamas Energindo Mineral is to implement programs based on Occupational Safety and Health (K3) regularly and consistently. This step is necessary because there are many workers who operate in high-risk environments but lack a good understanding of K3. The company uses a competency-based human resource (HR) management approach to increase workers' awareness of K3. It involves a wide range of programs and activities such as risk management, K3 education and training, K3 campaigns, K3 administration, emergency management, inspections, and investigations. In addition, health aspects are also emphasized through health examination programs, health services, first aid in accidents, hygiene and sanitation, ergonomic management, food, beverage, and worker nutrition management, as well as K3LH-based work environment management. As such, the company takes proactive steps to identify, measure, and manage risks related to occupational safety and health, as well as ensure workers' awareness and compliance with proper OSH practices.

In addition, from Jiano Santo Frans., et.al, (2015) shows that strategies to overcome risks in PT Arutmin Indonesia Asam Asam Mine require a deep understanding of geotechnical conditions in the area, especially in terms of areas prone to landslides. Combining real-time monitoring and slope control can be a key method to reduce the risks associated with unstable geotechnical conditions. Geotechnical engineers can use this method to make decisions when making recommendations on operations in areas that have geotechnical risk and potential for landslides. An important way to understand patterns and changes in geotechnical conditions is to monitor the behavior of rocks. This will help in maximizing rock production in areas prone to landslides. Adding the identification of progressive, linear, and regressive behaviors during the slope monitoring process will also allow companies to respond quickly to potential risks. Therefore, to ensure safe and efficient operations and sustainability, PT Arutmin Indonesia Tambang Asam Asam needs to focus on developing an advanced monitoring system and proactive management of geotechnical risks.

From several previous studies, it is clear that the mining industry plays a very important role in the economic development of a country, especially in South Kalimantan. Not only does it make a significant contribution to the fiscal and real sectors, but it also creates jobs and increases investment. However, high environmental impacts and safety risks require a comprehensive and up-to-date risk management approach.

An integrated risk management strategy, including the use of cutting-edge technology, ongoing training, and a commitment to regulatory compliance, is key to minimizing risk and improving occupational safety and health. With such a

proactive approach, mining companies such as PT Bara Indonesia Tbk. and PT. Senamas Energindo Mineral can identify, evaluate, and manage risks more effectively. In addition, the research also highlights the importance of a deep understanding of geotechnical conditions to reduce risks associated with natural disasters such as landslides. By adopting appropriate strategies, mining companies can maintain safe and sustainable operations, while minimizing negative impacts on the environment and surrounding communities.

Application of K3

Occupational Health and Safety (K3) is a very important aspect for mining companies, especially in South Kalimantan, given the work environment that is often full of risks and hazards. Mining, with all its activities such as quarrying, transporting, and processing materials, has a high potential for hazards, including work accidents, exposure to hazardous chemicals, and adverse environmental impacts. Therefore, the effective implementation of the K3 program is a must for mining companies to protect the health and safety of their workers. In addition, companies also need to comply with the K3 regulations that have been set by the government to prevent incidents that can threaten the lives and welfare of workers. By prioritizing K3, mining companies not only ensure protection for employees, but also maintain the company's reputation, minimize legal risks, and improve operational efficiency by reducing productivity time disrupted by occupational accidents or illnesses. In addition, investing in K3 training can also increase awareness of potential hazards and strengthen workplace safety cultures, creating a safer and more productive work environment for all parties involved in mining operations.

To prevent mining-related activities, increasing individual capacity in terms of knowledge and understanding of Occupational Health and Safety (K3) can be a solution. The organization of events that aim to increase workers' awareness of K3 in the context of mining activities can also be carried out. In the event of a potentially dangerous situation for humans, preventive measures should be taken to avoid accidents and uncertainties related to drilling activities. Inspection of buildings and equipment for workplace safety starts from the construction, placement, installation, and storage stages, as well as safety measures and signs that are constantly implemented to monitor and prevent accidents (Rahmadani et al., 2021).

K3 is seen as an effort to prevent work-related accidents and diseases. The implementation of K3 begins by identifying potential causes of accidents and occupational diseases that occur during mining business activities, and taking the necessary precautions. This includes risk management such as fire, explosion, landslides, toxic gases, and extreme temperatures. Risk management is an interactive process that mining companies use to identify, evaluate, and mitigate

risks in the workplace, thereby creating a safe and hazard-free work environment. The importance of systematic and fundamental risk management requires the integration of occupational health and safety management with other business management. This integration began with the social K3 management policy and the operationalization of the Occupational Safety and Health Management System (SMK3) (Rahma, 2022).

In the context of the mining industry, occupational safety and health (K3) is not only a regulatory obligation, but also a strategic investment for companies. By prioritizing K3, companies not only protect their most important assets, namely employees, but also ensure stable operational continuity, maintain the company's reputation, and minimize legal risks and financial losses that can arise from work incidents. Through the systematic integration of risk management and a sustainable approach to K3, mining companies can create a safe, productive, and sustainable working environment for all parties involved in their operational activities.

Ongoing Training for Employees

In the context of mining, ongoing training for employees is even more important given the often complex and diverse work environment. This training will include an in-depth introduction to the specific hazards and risks associated with mining activities, such as mining accidents, explosions, exposure to hazardous chemicals, and environmental impacts. Employees will also be trained to use proper safety equipment and safe work techniques, as well as to identify potential hazard signs at mine sites. In addition, the training will provide a solid understanding of emergency procedures and evacuation plans, so employees can act quickly and effectively in emergency situations. In addition to focusing on safety aspects, the ongoing training will also discuss best practices in environmental risk management, including efforts to reduce the impact of mining on the environment and surrounding communities. Thus, this ongoing training not only aims to protect the safety and health of employees, but also to ensure the sustainability of responsible and sustainable mining operations (Ramadhan & Jati, 2019).

Continuous training for employees in the mining industry in South Kalimantan is an important investment in human resource development and occupational safety. By strengthening employees' skills in identifying, managing, and mitigating risks in the work environment, companies can create a safer and more productive work environment. In addition, continuous training also allows employees to stay relevant in the face of technological changes and best practices in the mining industry, thereby improving operational efficiency and quality of work.

On the other hand, continuous training also plays an important role in maintaining a balance between the exploitation of natural resources and environmental conservation in South Kalimantan. By providing a deeper understanding of the environmental impact of mining activities and how to reduce them, employees can

play an active role in maintaining environmental sustainability. This is important to ensure that mining in South Kalimantan can provide long-term benefits to the community and the environment, while still meeting the needs of the industry.

Environmental Risk Management

In managing environmental risks in the South Kalimantan mining industry, the latest approach that can be adopted is to prioritize sustainable and environmentally friendly practices. Mining companies must prioritize technological improvements and innovations to reduce environmental impact. This can include the use of advanced technologies in the mining process, such as cleaner and more efficient extraction methods and the use of environmentally friendly equipment. In addition, the implementation of post-mining land restoration and rehabilitation practices is also important to minimize long-term environmental damage.

In addition, collaboration between mining companies, the government, and local communities is needed to manage environmental risks effectively. This involves establishing strong and transparent partnerships to monitor and evaluate the environmental impacts of mining activities as well as identify timely solutions. Local governments can also strengthen regulations and law enforcement to ensure that mining companies operate in accordance with established environmental standards. Then, it is important to increase public awareness and involvement in environmental risk mitigation efforts. This can be done through education and training programs on the importance of environmental conservation as well as active community participation in the supervision and monitoring of mining activities. By actively engaging the community, mining companies can gain a better understanding of local needs and concerns, so they can design more effective and sustainable risk management strategies. By implementing these strategies, the mining industry in South Kalimantan can reduce its negative impact on the environment while still maintaining its productivity and sustainability (Meilan et al., 2018).

By adopting an approach focused on sustainable practices, strong collaboration between companies, governments, and local communities, and the application of the latest technologies and innovations, the mining industry in South Kalimantan can maintain a balance between economic growth and environmental conservation. Through these measures, mining companies can manage environmental risks more effectively, minimize their negative impacts, and create long-term benefits for the environment and society. With a shared commitment to sustainability, the mining industry can become a positive agent in sustainable development in South Kalimantan. These measures will not only generate benefits for the company and society as a whole, but will also provide long-term benefits to an environment that is vulnerable to the impacts of mining activities. Through this approach, mining

companies can be pioneers in changing the industry paradigm from a potential source of environmental damage to an agent of positive change that contributes to sustainable development in South Kalimantan, combining economic success with sustainable environmental protection.

E. CONCLUSION

The latest risk management strategy for the mining industry in South Kalimantan highlights the importance of an integrated and proactive approach in managing complex and diverse risks. Through the use of cutting-edge technology, ongoing training for employees, and a commitment to regulatory compliance, mining companies can minimize risks and improve occupational safety and health. The importance of a deep understanding of geotechnical conditions is also highlighted as a key step in reducing risks associated with natural disasters such as landslides. Strong collaboration between companies, governments, and local communities is also an important factor in effectively managing environmental risks. By adopting a sustainable approach and focusing on sustainability, the mining industry can become a positive agent in sustainable development in South Kalimantan, creating long-term benefits for the environment and society.

The mining industry in South Kalimantan needs to implement an integrated and proactive approach to risk management, with a focus on cutting-edge technology, ongoing employee training, regulatory compliance, and a deep understanding of geotechnical conditions. Strong collaboration between companies, governments, and local communities is also needed to effectively manage environmental risks. By adopting a sustainable approach, the mining industry can become a motor of sustainable development in South Kalimantan, providing long-term benefits to the environment and society.

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