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Operational Risk Mitigation Strategy in the Engineering Department: A Case Study of PT XYZ

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Abstract: *Operational risk is one of the significant challenges that can hinder the achievement of a company's goals, especially in strategic departments such as the Engineering Department. Risk identification and mitigation are important steps to ensure smooth operations and maintain the company's overall productivity and performance. This study aims to evaluate and optimize operational risk mitigation strategies in the Engineering Department of PT XYZ, which operates in the cement production sector. With a qualitative approach, this study analyzes various risks faced, including design suitability, reliability of safety monitoring, and budget management. The results show that the implementation of systematic and proactive mitigation strategies can significantly reduce potential risks that can interfere with smooth operations. In addition, this study found that effective communication with stakeholders and the implementation of feedback from customers are essential to increase customer satisfaction and trust. The resulting recommendations include the preparation of project completion time standards, periodic evaluations of performance, and more detailed mapping of budget needs. Thus, this research contributes to the development of best practices that can be adopted by other companies in the same industry. The results of this study are expected to improve PT XYZ's operational performance and strengthen its position in a competitive market.*

Keywords: *Mitigation Strategy, Risk Management, Risk Mitigation*

1. INTRODUCTION

The cement industry has a very important role in infrastructure development, both at the national and global levels. PT XYZ, as one of the leading companies in Indonesia engaged in the cement production sector, plays a strategic role in meeting the growing market demand (Indrawan, Suarlin, & Sirlyana, 2022). However, behind its vital role, PT XYZ faces various operational challenges that can affect the smooth running of its business processes. Potential operational risks, such as design changes during project implementation, inappropriate budgeting, and delays in project implementation, require serious attention so as not to have a major impact on the company's performance.

The Engineering Department of PT XYZ has a very crucial responsibility in managing these operational risks. As a unit in charge of designing and managing project documents from the initiation phase to execution, the Engineering Department must have an effective risk mitigation strategy to maintain smooth operations. These mitigation strategies can take the form of various actions, from standardizing completion times and project designs, to applying technology to improve operational efficiency and prevent unwanted incidents. However, although various mitigation measures have been implemented, there is still an opportunity to

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increase the effectiveness of existing strategies to better suit the dynamics and needs of the company.

This study aims to evaluate and optimize operational risk mitigation strategies in the Engineering Department of PT XYZ. By analyzing the various control measures that have been implemented, this study will identify potential improvements that can be made to further mitigate existing risks, as well as provide applicable and strategic mitigation recommendations. It is hoped that the results of this research can not only improve PT XYZ's operational performance, but also contribute to developing best practices that can be adopted by other companies in the same industry.

2. LITERATURE REVIEW

Risk is defined as uncertainty caused by changes. Risk is a deviation from something expected (Kristiana & Yusuf, 2022). Existing risks can be managed using a risk management approach, which is a systematic approach in determining improvements to a risk (Deny et al., 2023). Risk management is essential because it can prepare companies for situations that could lead to losses. A company is protected from significant risks through the use of risk management (Rahmadanis et al., 2023). Common problems in operational risk control include human resource risk, warehousing supervision risk, raw material spare parts procurement risk, and production system risk (Arviana & Suseno, 2024).

Risk management is a field of science that discusses how an organization applies measures in mapping various existing problems by placing various management approaches comprehensively and systematically (Satriawan, Arta, & Loppies, 2021). Activities in the procurement process have the opportunity to arise risks. Therefore, risk management is very necessary to be used in risk management aimed at reducing the level of risk and the impact of risks. Business risk in a company describes a doubt that can result in losses and problems for the company. Business risk can be categorized into 4 parts, namely financial risk, operational risk, strategic risk, and externality risk (Mamesah et al., 2022). The existence of operational risks is caused by several factors such as processes that fail due to ineffective internal coordination, human error, system failures, and external factors that affect the company's goals (Akmal & Kurnia, 2023). The main goal of risk management is to avoid risks that can harm the company and hinder the achievement of the desired goals (Fole, 2023). Risk identification is a process by which a company systematically and continuously identifies property, liability and personnel exposures before a crisis occurs (Arta, 2021).

Every company must of course estimate the risks that will occur. This risk must be considered by companies to be able to survive in business competition. Because every company cannot escape from the competition (Muhammad Asir et al., 2023). Various risk avoidance measures continue to be sought, but various possible losses still occur, requiring preparation and mental steel to anticipate various potential losses or risks (Kristiana et al., 2022). A really better strategy for risk management is to be proactive (Hairul, 2020). This strategy involves choosing an approach to managing risk, such as avoiding risk, reducing risk through prevention or mitigation measures, and accepting risk by understanding and managing it (Ningsih et al., 2024). The operational risk measurement model is greatly influenced by the initial process, namely risk identification. Complete risk identification is still needed to obtain a comprehensive risk map to think about strategies for managing and mitigating risks (Dewi, 2019).

3. METHODS

The research method used is a qualitative approach, which aims to understand in depth the problem being researched. This approach involves collecting data through interviews, observations, and document analysis (Anto et al., 2024). The qualitative method in this study was used to identify operational risks and formulate mitigation strategies in the Engineering Department of PT XYZ. The primary data in this study is data obtained from project management operational engineering.

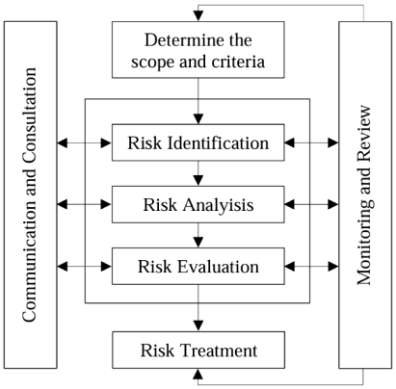

Figure 1 Risk Management Process

Risk mitigation is a process that consists of several main stages that are interrelated. The first step is to define the scope and criteria, where the scope of the risk and evaluation criteria are defined to ensure a clear focus, this stage involves an analysis of the operational context to determine the most relevant risks. Furthermore, risk identification is carried out, which is to collect information related to potential risks that can affect operations. Once the risk is identified, the next step is a risk analysis, which aims to evaluate its severity, likelihood

and impact. The risk assessment matrix method and qualitative analysis based on historical data are very helpful in determining mitigation priorities. The risks that have been analyzed are then evaluated to determine whether the level of risk is acceptable or requires further control or mitigation. This evaluation process often involves cross-bureau discussions to get an agreement.

The next stage is risk treatment, namely the development of mitigation strategies to reduce the impact of risks. In the context of PT XYZ, strategies such as more intensive maintenance of tools (risk reduction), risk sharing through insurance, or even risk acceptance can be applied based on priority. In addition, communication and consultation are important aspects that ensure all relevant parties understand the risks and mitigation strategies designed. The final stage is monitoring and review to ensure that control and mitigation strategies are relevant and effective. Periodic audits and data analysis can be used to evaluate the success of mitigation. Through this approach, the operational risk mitigation strategy at PT XYZ can be optimized to ensure operational efficiency and sustainability.

4. RESULTS

There are several stages for Risk Assessment that must be done. Starting from risk identification, risk analysis is accompanied by risk assessment, then continued with risk evaluation. The first stage is risk identification. This stage presents the results of the identification of operational risks in the Engineering Department of PT XYZ which has been compiled based on data analysis. The risks identified include aspects of project design, safety performance, and management that have the potential to affect the achievement of operational targets. The following Table 1 summarizes the results of risk identification based on KPIs/processes, risk codes, risk names, and risk descriptions in more detail.

Table 1 Risk Identification

KPI/Process Name	Code	Name of Risk	Risk Description
Fulfillment of Design & Engineering	R1	Engineering Design Conformity	Achievement of FEED, DED & Technical Assist work.
Safety Performance	R2	Reliable Monitoring & Evaluation of Safety Performance	The measures of safety achievement that must be achieved by the Company consist of some or all of the safety components as follows: Lost Time Injury Frequency Rate (LTIFR), Zero Fatality Rate (ZFR), and Number of Fire Accident (NoFA) for the Development Capex Project (Strategic & Operational Improvement).
Kajian dan Debottlenecking Solution	R3	Project Budget Management	Availability of Engineering Analysis and Recommendations for Technical Problems that Require Engineering Recommendations.
ICSI (Internal Customer Satisfaction Index)	R4	Customer Satisfaction	The level of customer satisfaction with the services provided by the Work Unit.

Score 5R Implementation	R5	Score 5R	The assessment value of the implementation of the 5R program (Ringkas, Rapi, Resik, Rawat dan Rajin) can be reflected in the internal assessment score related to the implementation of 5R.
Strategic Initiatives Execution	R6	Punctuality of Project Implementation	The success rate of the execution of Projects or Strategic Initiatives with the criteria of On Time, On Budget, and On Scope.
Implementasi Coaching	R7	Coaching implementation is ineffective	The percentage of the number of employees who have been coached by the head of the work unit against the number of employees in the work unit.

After risk identification, it is followed by the risk analysis stage. This stage aims to analyze the severity and possible risks that have been previously identified. Each risk is evaluated using two parameters, namely Likelihood (L) and Consequence (C), to obtain a risk score qualitatively. Table 2 presents the results of risk analysis based on risk code, risk name, risk description, and Likelihood and Consequence values.

Table 2 Risk Analysis and Risk Scoring

Code	Name of Risk	Risk Description	L	C
R1	Engineering Design Conformity	Achievement of FEED, DED & Technical Assist work.	4	3
R2	Reliable Monitoring & Evaluation of Safety Performance	The measures of safety achievement that must be achieved by the Company consist of some or all of the safety components as follows: Lost Time Injury Frequency Rate (LTIFR), Zero Fatality Rate (ZFR), and Number of Fire Accident (NoFA) for the Development Capex Project (Strategic & Operational Improvement).	3	2
R3	Project Budget Management	Availability of Engineering Analysis and Recommendations for Technical Problems that Require Engineering Recommendations.	2	2
R4	Customer Satisfaction	The level of customer satisfaction with the services provided by the Work Unit.	2	3
R5	Score 5R	The assessment value of the implementation of the 5R program (Ringkas, Rapi, Resik, Rawat dan Rajin) can be reflected in the internal assessment score related to the implementation of 5R.	3	1
R6	Punctuality of Project Implementation	The success rate of the execution of Projects or Strategic Initiatives with the criteria of On Time, On Budget, and On Scope.	3	4
R7	Coaching implementation is ineffective	The percentage of the number of employees who have been coached by the head of the work unit against the number of employees in the work unit.	3	3

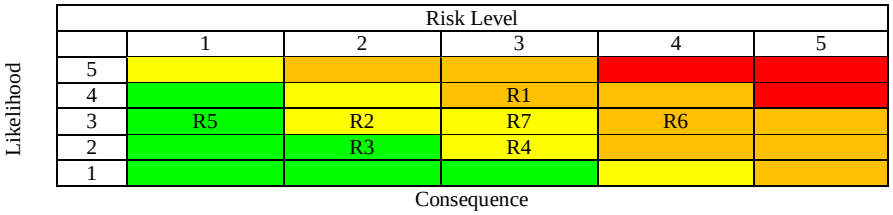

Figure 2 Risk Mapping

After conducting risk analysis and assessment, it is followed by the risk evaluation stage. This stage aims to assess the level of risk based on previous analysis and determine the control measures and mitigation strategies that need to be implemented. Risks with high scores are the top priority to be effectively mitigated. Table 3 presents the results of the risk evaluation, including the controls that have been carried out and mitigation plans to reduce the level of risk.

Table 3 Risk Evaluation

Kode	Risk Scoring	Pengendalian	Mitigasi
R1	12 (high risk)	• The requesting user fills out the basic study/design scope on the ERF form in the EDEMS application. • Develop FEED and DED turnaround time standards based on internal agreements of the Design & Engineering Dept. • Approve Engineering and Design documents in stages. • Mapping the workload against the EAT (Engineering Assignment Task) Design work to manage the incoming ERF schedule.	• Develop design guidelines that comply with industry standards and project technical requirements. • Design a meeting with the user after the ERF form is input in EDEMS. • Conduct an analysis of the available project budget needs in the event of a design redraft. • Provides a feedback loop mechanism for design improvement and weekly monitoring of design progress to ensure time targets are met.
R2	6 (medium risk)	• Regular monitoring of safety documents and data. • Establish the process of approving documents related to safety performance in stages. • Standard time for evaluating safety performance results.	• Compile a structured repository of safety reporting. • Develop a reward system for good safety performance. • Provide clear and well-trained emergency response procedures.
R3	4 (low risk)	• Map project budget needs in detail based on incoming ERF. • Create SLA (Service Level Agreement) documents with related parties. • Identify potential budget risks from the beginning of the project and prepare budget reserves.	• Engineering Cost Estimation (ECE) adjustments based on the market price value approach and previous project references. • Approval of project budget planning in stages. • Coordination and communication with all project stakeholders periodically to minimize budget changes.
R4	6 (medium risk)	• Periodic monitoring of customer satisfaction using surveys or feedback. • Conduct intensive coordination and communication with customer stakeholders to ensure their needs are met. • Ensure good communication between the engineering team and related work units.	• Create weekly project progress reports that customers can access. • Develop customer service SOPs based on customer needs. • Evaluate services based on customer satisfaction data.
R5	3 (low risk)	• Establish key performance indicators (KPIs) for the 5R program.	• Conduct a final inspection to ensure all work areas comply with the 5R principles before the project is completed.

		• Conduct regular inspections to ensure the application of the 5R principle in the work area. • Create regular reports to evaluate the sustainability of the program.	• Providing training and incentives to the engineering team related to the implementation of 5R. • Integrate 5R into company culture.
R6	12 (high risk)	• Approval of project and design documents in stages to speed up the decision process. • Standardize the time for project progress evaluation (weekly/monthly). • Monitoring of construction documents and work on a regular basis.	• Create a project reporting repository to monitor progress transparently. • Provide deadlines for work progress reports to contractors early to reduce delays. • Conducting intensive coordination with work implementers in the field to avoid obstacles. • Develop alternative work plans to anticipate delays.
R7	9 (medium risk)	• Evaluate the competencies of personnel given coaching before and after the program. • Develop a coaching implementation schedule that is integrated with project activities. • Establish indicators of the success of the coaching program.	• Tailor coaching materials to the needs of individuals or work units. • Monitoring the implementation of coaching results in the field to ensure their impact on work. • Conduct periodic evaluations of coaching effectiveness.

Table 3 above is a risk evaluation table that contains information about risk levels (Risk Scoring Code), control measures, and mitigation strategies that can be applied in the Engineering Department. Risk is categorized into three levels, namely high risk with a score of 9–12, medium risk with a score of 6, and low risk with a score of 4–5. At high risks, such as R1 and R6, control measures include project and design document approval and workload mapping to ensure a balanced workload, while mitigation measures implemented include the preparation of design guidelines, budget needs analysis, and transparent monitoring of work progress. For intermediate risks such as R2, R4, and R7, control focuses on periodic monitoring, determining the approval process, and performance evaluation, while mitigation strategies include the preparation of service SOPs, the development of reporting systems, and the implementation of coaching according to individual or team needs. At low risks such as R3 and R5, control is carried out through regular inspections, the determination of SLAs (Service Level Agreements), and mapping budget needs, while the mitigation involves adjusting project cost planning, evaluating customer service, and strengthening work culture such as the application of 5R principles. Overall, this table shows systematic efforts in identifying, controlling, and mitigating operational risks, focusing on improving time management efficiency, team communication, employee competency development, and transparency in project monitoring to ensure smooth operations in the Engineering Department.

5. CONCLUSION AND SUGGESTIONS

Conclusion

Through an in-depth analysis of various risks faced, such as design suitability, reliability of safety monitoring, and budget management, this study shows that the implementation of effective mitigation strategies is crucial to maintain smooth business processes and improve company performance. The results of the study indicate that by compiling a standard completion time, conducting periodic evaluations of performance, and mapping budget needs in detail, PT XYZ can reduce potential risks that can disrupt operations. In addition, the importance of good communication with stakeholders and the implementation of feedback from customers is also emphasized as a strategic step to increase customer satisfaction and trust.

Overall, this study not only provides practical recommendations for PT XYZ in managing operational risks, but also contributes to the development of best practices that can be adopted by other companies in the same industry. Thus, systematic and proactive risk management will be the key to achieving long-term success in facing challenges in the competitive cement industry.

Suggestions

The company conducts regular training and monitoring for employees regarding risk management and mitigation strategies that have been implemented, so that the entire team has the same understanding and can actively contribute to risk management. In addition, further research can be conducted to explore the use of information technology and digital-based risk management systems that can help in real-time risk monitoring and evaluation. With these steps, it is hoped that PT XYZ can be better prepared to face future challenges and improve operational performance.

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